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# TACTICS

BY

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## VOLUME II.

## CAVALRY, FIELD AND HEAVY ARTILLERY IN FIELD WARFARE.

AUTHORIZED TRANSLATION FROM THE GERMAN

BY

WALTER KRUEGER,
First Lieutenant, Third Infantry, U. S. Army,

**Fourth enlarged and completely revised edition.**
**With numerous plates in the text.**

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A. I. Lacey

# TRANSLATOR'S PREFACE.

The kind reception accorded his translation of Volume I of Tactics here and abroad, and many urgent requests received from brother officers for a similar book on cavalry and artillery, prompted the translator to undertake the transation of Volume II.

This is an epitome of the interpretation and application of tactical principles in the cavalry, field and heavy artillery of the various armies, discussed in the light of tactical views and methods prevailing in Germany, and amplified by numerous examples from military history.

The author's views differ in many respects from those generally accepted in our service, but that very fact tends to enhance the value of his work, for it enables the student to see things from a different angle and stimulates reflection.

The translator's aim has been to reproduce, in English, as faithfully as possible, the ideas of the author. If he has been moderately successful in this, and has helped his brother officers to get a deeper and broader conception of tactics, he will feel amply repaid for his work.

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# PREFACE.

This, the second volume of "TACTICS" treats of the employment of cavalry, field and heavy artillery in field warfare, with due regard to the great influence exerted on them by the lessons of recent campaigns. Although cavalry was unable to win victories with the *arme blanche* in the Balkans, in South-Africa, and in Manchuria, the science of combat as such should nevertheless point out that cavalry need by no means dispense with shock action; that, in spite of all mechanical improvements in fire arms, saber and lance have not, by a long shot, become useless. While I place a high value upon the use of fire action, I am firmly convinced that the days of mounted charges are, by no means, over. The more our opponents are convinced of the futility of a charge against infantry or artillery, the better the chances of our success.

The employment of heavy artillery has, of course, received thorough treatment in these pages. The events of the Russo-Japanese war give but a faint idea of the power of the modern rapid fire gun, although the latter's shrapnel was so effective as to force the artillery of both belligerents into masked positions and very materially protracted the combats.

The lessons of the Russo-Japanese war, however, are applicable only to guns without shields, and in my opinion the changes produced in tactics by the adoption of rapid fire guns in place of the slower firing cannon, were by no means so radical as those that were the immediate result of the introduction of gun shields. Gun shields will impart an entirely new character to the artillery combat of the future.

*New weapons, new Tactics.* Tactics can not wait until the next great war is upon us, but must look into the future and endeavor to devine the changes that coming events will require. Nevertheless, we will not be spared surprises. These will be the greater, the less we have studied, in time of peace, the characteristic properties of modern weapons, and the less we have appreciated these weapons at their true value.

In discussions on effects of fire, I have throughout followed the exhaustive works of His Excellency Lieutenant-General Rohne. Statements in regard to the strength of opposing forces during the Franco-German war are taken from the very able and trustworthy research work of Major Kunz. Wherever examples from military history are taken from General Staff Accounts (Gen. St. W.) or from regimental histories, appropriate references are given in all cases. On the Russo-Turkish war, I have consulted the comprehensive work of Major Springer, Austrian Army, and the Critical Review (*Kritische Rückblicke*) by General Kuropatkin as well as the Austrian translation of the Russian General Staff Account, now in course of preparation. The copious literature available on the Russo-Japanese war was utilized as far as possible.

I desire to express, at this point, my sincere thanks for the assistance received from officers of all arms and from those who participated in the recent campaigns.

THE AUTHOR.

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## ABBREVIATIONS USED IN THIS TRANSLATION.

British Reports = Reports of British Officers attached to the Russian and Japanese forces.

C. D. R. = Cavalry Drill Regulations.

F. A. D. R. = Field Artillery Drill Regulations.

F. A. F. R. = Field Artillery Firing Regulations.

Gen. St. W. = *Generalstabswerk* = German General Staff Account of the Franco-German War (unlesss otherwise indicated).

H. A. D. R. = Heavy Artillery Drill Regulations.

H. A. F. R. = Heavy Artillery Firing Regulations.

HOFFBAUER, *Deutsche Artillerie*, I = German Artillery at Weiszenburg.
" " " II = " " " Wörth.
" " " III = " " " Colombey.
" " " IV = " " " Vionville-Mars-la-Tour.
" " " V = " " " Gravelotte.
" " " VI = " " " Noisseville.
" " " VII = " " " Beaumont.
" " " VIII = " " " Sedan.

I. D. R. = Infantry Drill Regulations.

I. F. R. = Infatnry Firing Regulations.

KUNZ, *Deutsche Reiterei*, = German Cavalry in the Battles and Engagements of the Franco-German War, by Major Kunz.

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g. = gram = 15,432 troy grains.

kg. = kilogram = 1,000 g. = 2.2 lbs.

kgm. = kilogrammeter = a unit of work accomplished in raising a kilogram through a meter against the force of gravity.

m. = meter = 39.37 inches.

km. = kilometer = 1,000 m. = $\frac{5}{8}$ mile.

x = pace.

# THE FORMAL TACTICS OF CAVALRY.

# THE TACTICS OF CAVALRY.

## I. GENERAL.

### 1. ARMS AND EQUIPMENT.

Cavalry, unlike infantry or artillery, can not be improvised during the course of a campaign. This fact is most intimately related to the peculiar characteristic of cavalry—trained trooper and trained horse; the former to use his weapons while riding at top speed, the latter to carry a heavy load across country at a gallop.* In the infantry, trained men are used to fill up existing cadres, whereas in the cavalry, untrained horses must be assimilated. Even trained horses are not at once equal to the demands made by a campaign; they require some time to become accustomed to exertions under service conditions. If great exertions are demanded of them at the start, they will break down within a short time. By the time the battle of Königgrätz was fought, the Prussian cavalry had already lost half of its augmentation horses. Untrained horses are unsuited for movements in close order; they are unsteady, refuse to leave the ranks, and can not be sufficiently controlled to enable the trooper to use his weapons.†

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* "The trained horse, which, owing to the equal suppling of all of its muscles, moves well balanced, saves its forelegs and joints, supports its back better, trots with less fatigue, and has, in general, more endurance than the untrained animal, which stiffens itself against the rider's load and thus expends power uselessly. Besides, the rider himself experiences far less fatigue on a trained mount than on an untrained horse, a point by no means to be underestimated." v. BERNHARDI, *Unsere Kavallerie im nächsten Kriege*, 1903, p. 131 (see *Cavalry in Future Wars*, by v. BERNHARDI, GOLDMAN'S translation, p. 185).

† Failure of purchase horses: Charge at Ville sur Yron. According to the history of the 10th Hussar Regiment (p. 138), seven of the fourteen Hussars that were wounded rode purchase horses. After the surprise at Pont *à* Mousson, two out of thirty-two Dragoons were captured because they were unable to force their purchase horses to jump into the Moselle. *Cavalry on Service*, by v. PELET-

Cavalry formed during the course of a campaign is, for the time being and until it succeeds in attaining a higher standard of training, not much more than mounted infantry. This explains the complete failure of the French to make any battle use of their cavalry during the spring campaign of 1813, and of their march regiments (forty-five of which were newly organized) in 1870-71, and the similar failure on the part of the British in the South African war after all their available horses had been used up.

At the commencement of hostilities in 1813, the French cavalry numbered only 1,600 mounted and 1,200 dismounted troopers. After the victory at **Bautzen,** the French army, according to Foucart, numbered 202,500 men of all arms, including 11,000 cavalry. The failure of the French cavalry during the pursuit after this battle was not due to to its small numbers, but to its poor training.

In May, 1813, the Prussian cavalry consisted of 76 escadrons with 7,291 horses, and at the termination of the armistice, it consisted of 84 Line and 116 Landwehr escadrons, 20 escadrons Volunteer Jäger, and 3 National cavalry regiments, with a total of 27,945 horses. This does not include 22 depôt escadrons.

In a memorial addressed to Fieldmarshal Blücher in 1817, General von Borstell made the following observations in regard to the Landwehr cavalry raised during the War of Liberation:* "The Landwehr troopers, however, could not ride, although that is indispensable for service in ranks. They rode poor, weak mounts, whom they were unable to control. Besides, they did not know how to use their weapons, and were, in addition, undisciplined. During a charge, they were brave to the point of forgetting all obedience and order; during a retreat, on the contrary, after a charge that had been repulsed, only natural obstacles were, as a rule, able to stop them. In a word, the Landwehr cavalry, even more than the cavalry of the Line, lacked physical and moral stamina and unqualified obedience to the trumpet. The latter, however, should be part and parcel of the trooper's make-up to an even greater extent than obedience to the signal horn is to

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NARBONNE, LEGARD'S translation, p. 225.—It is worthy of note that, during the mobilization in 1870, the purchase horses of the 15th Uhlan Regiment were formed into a fifth platoon in each escadron (*Eskadron*). This arrangement was practicable because the escadrons were still at full strength when they took the field, and, moreover, gave an opportunity gradually to accustom the horses to work under the saddle. *Ibid.*, p. 278.

NOTE: The term *Eskadron* has been rendered by **escadron** in this work. The escadron is the tactical, as well as the lowest administrative unit of European cavalry. For the strength of the escadron in the various armies, see table facing this page.—*Translator.*

* KAEHLER *Preuszische Kavallerie*, p. 10.

that of the *tirailleur*. In the course of the war, I saw Landwehr cavalry regiments that, without having suffered serious losses at the hands of the enemy, had an effective strength of not more than 100 horses; and yet such organizations were classed as regiments and disposed of as such. This weakness is a result of rapidly and hastily raising cavalry units at the outbreak of war."* Until 1852, the Landwehr cavalry was armed with the lance, and troopers who had not been trained in handling that weapon had to learn how to use it during the period of mobilization. The Landwehr cavalry regiments to be raised in a future mobilization will have an advantage over those raised in 1813, in that they will at least possess trained riders, of whom, if they are recruited in a district where good mounts are available, something may be expected soon after the opening of hostilities. During the battle of **Noisseville**, the 1st Escadron of Prussian Reserve Dragoons began to charge, and at **Oswiecim** (also written Auschwitz), June 27th, 1866, the 2d Escadron of Landwehr Uhlans successfully charged Austrian Uhlans.

The German cavalry, both divisional and independent, is uniformly trained, armed and equipped. Differences in the physical development of men and horses necessitate a division into heavy, medium and light cavalry, but this in no way affects the tactical employment of the cavalry. To the introduction of a neutral tinted uniform, there is the objection that friend may not be distinguishable from foe,† and that it is more difficult to assemble a large unit after a charge. The trooper carries the lance, the carbine and the saber. The saber is carried attached to the saddle in order that the movements of the trooper may not be impeded when dismounted to fight on foot. This mode of carrying the saber is objectionable only in case the trooper falls or becomes separated from his horse. Officers, non-

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* See also v. d. MARWITZ, *Erinnerungen*, II, p. 83. In regard to the charge made by Landwehr cavalry during the engagement at Hagelberg, Colonel von BISMARK states: "I can turn them loose soon enough, but whether I shall afterwards again see a single man, that is a different question, and I can not be responsible for it." (v. d. MARWITZ, II, p. 170). In regard to a charge made during the armistice, and in which all order was lost, v. d. MARWITZ writes (II, p. 73): "His majesty observed that it was indeed fortunate that the wall had stood so firmly."

† KUNZ, *Reiterei*, p. 38 (Prussian Black Hussars and Baden Dragoons on August 4th); p. 69 (Prussian Uhlans, and Bavarian Cuirassiers in white overcoats on August 6th); p. 138 (French Light Blue Guard Lancers at Vionville, which, in order to prevent confusion, had left behind their white coats (*Uhlankas*) on moving into the field); p. 142 (French Brown Hussars are charged by French Dragoons).

commissioned officers and trumpeters carry the revolver,* and non-commissioned officers, in addition, the lance.

*Views on the lance.* In the Russian cavalry, in which formerly the front-rank men in each regiment were armed with the lance, that weapon was abolished in 1884. In Austria, the lance was abolished in 1863, and in France, in 1871. At the present time, the lance has been readopted for the entire German cavalry, and the Dragoon regiments of the French cavalry divisions have likewise been again armed with that weapon. The first British Lancer and Dragoon regiments sent to South Africa carried the lance; the regiments mobilized later exchanged the lance for the rifle. The Germans enumerate the following as special advantages of the lance: the moral effect produced by a line of charging cavalry armed with the lance; the value of the lance in riding down the opposing cavalry; the chance it affords the trooper of defending himself against several opponents armed with sabers; and the dangerous character of the wounds produced by it.† The lance alone does not absolutely guarantee success, for the success of a charge is, in the main, determined by other factors, but the lance undoubtedly contributes to the successful issue of the fight. In a close mêlée, the lance may become an impediment and the saber may be an advantage.‡

But as soon as the mêlée turns into a number of isolated hand-to-hand combats, during a pursuit and during

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* The revolver has been replaced by pistol, model 1908.

† Staff Surgeon Dr. Schaefer (Archive of Clinical Surgery, Vol. 62, Chapter III) lays particular stress on the mild character of the wounds produced by the lance. Out of 600 wounds reported to have been produced accidentally in time of peace, only 10.8 percent. resulted fatally. Although wounds produced by the lance belong to the class of puncture wounds (the lance penetrates, as has been observed, horse and rider when it is driven into the ground and the horse runs against it), its comparatively blunt and gently tapering point enables the lance to push aside unharmed, when it penetrates into the body, easily displaced organs, such as the heart, the stomach, nerves and entrails.

‡ "In a mêlée it [the lance] never proved troublesome or unnecessary to the trooper. In the various situations, he always knew how to use it to advantage. The greater length of the [Prussian] lance was an advantage and cost the enemy much loss in a charge. The shorter Austrian lance, provided with a button, was often used as a club, and the purpose for which the lance was intended was thus ignored." BESSER, *Preuszische Kavallerie in der Campagne von 1866*, p. 101.

an attack on infantry or artillery, the lance at once regains its superiority. A trooper armed with a lance will be better able to keep a pursuer at a distance than a trooper who is armed with the saber only. Against a cuirass neither the lance nor the saber can accomplish anything.

In the report made by the 11th Uhlan Regiment on the charge at **Königgrätz,** it is emphasized that the lance proved superior to the sabers of the Austrians in spite of the fact that the latter wore loose, flowing overcoats; and that the lance proved a much more terrible weapon than had been anticipated. The engagement at **Saar** (July 9th, 1866) is especially instructive. In this engagement, two escadrons of the 9th Uhlans [armed with the lance], charged two escadrons of Austrian Hussars [armed with the saber], threw them back and pursued them for 5 km., while at the same time keeping up a running hand-to-hand fight. The losses were as follows:

Uhlans: 1 officer, 17 men and — horses;
Hussars: 5 officers, 38 men and 38 horses.*

In the charge made by French Guard Lancers against Oldenburg Dragoons at **Mars-la-Tour,** the total loss of the Prussian cavalry employed was 46 officers and 402 men (out of an effective strength of 2,925 men, *i. e.*, a loss of 15.2 percent.), the loss of the Oldenburg Dragoons alone being 12 officers and 113 men (27.3 percent.).† During the charge, the troopers of the various German regiments, some armed with the saber, some with the lance, made common cause, in order to break down the resistance offered by isolated French troopers who, separated from their horses, defended themselves with their firearms.

The lance will likewise be superior to the saber in a charge against infantry and against artillery.‡

After the charge at **Königgrätz,** many non-commissioned officers of the 4th Uhlan Regiment armed themselves with the lance, whose worth they had learned to appreciate in action.¶

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* According to the *History of the 9th Uhlan Regiment*, p. 14. See also the small action at Bolchen (August 9th, 1870) in *Cavalry on Service*, by v. PELET-NARBONNE, LEGARD'S translation, p. 119.

† KUNZ, *Reiterei*, pp. 139 and 141.

‡ Length of the lance:

| | | |
|---|---|---|
| Old Austrian lance | 2.63 m. | |
| Old French lance | 2.84 " | |
| Old Prussian lance | 3.14 " | |
| Cossack lance | 3.16 " | (Weight, 2.87 kg.) |
| New French lance | 2.90 " | (Weight, 1.85 kg.) |
| New German lance (of steel tubing) | 3.52 " | |
| New Italian lance | 2.95 " | (Weight, 2.55 kg.) |

¶ *Geschichte des 4. Uhlanen Regiments*, p. 82.

The employment of the lance requires that troopers and remounts be well developed physically, and that the trooper be thoroughly trained in handling his horse and his weapon.* This may, perhaps, make it necessary in a campaign to arm recruits with the saber only.† The lance considerably increases the load to be carried and causes an unequal distribution of the same. This is a disadvantage that is apt to lead the trooper to lounge in the saddle when fatigued and riding at a walk for long distances, thus causing sore backs. It can not be denied that the lance is an impediment in the field when writing messages, when riding across country, especially through woods, and on roads with overhanging branches of trees; when jumping and climbing; in dismounted action, and on young, unruly and fractious horses. But these disadvantages can not outweigh the other advantages of the lance.

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* " . . . The lance, although a terrible weapon in the hands of a man who knows how to use it, is an impediment, in fact a positive detriment, in the hands of one not accustomed to it." HEROS VON BORCKE, *Zwei Jahre im Sattel und am Feinde*, I, p. 43.—General MARMONT is also a warm advocate of the lance as a weapon for cavalry of the Line. In *Esprit des Institutions*, p. 45, he says: "The lance should be the principal arm and the saber an auxiliary arm."

General DRAGOMIROV says: "Military history shows that in a charge made in close order, as well as in hand-to-hand combat, the saber always gains the superiority, provided a mêlée actually occurs."

Colonel WALTER von WALTHOFEN, Austrian Army, voices the same opinion in *Kavallerie im Zukunftskriege*. He says: "The lance has gained importance as a weapon through a very different feeling, through the desire for self-preservation, the desire to keep the enemy at a distance and to avoid fighting him breast to breast."

† The Prussian Landwehr troopers from Brandenburg entered the spring campaign of 1813 armed with lances. After four weeks' instruction in its use, the troopers gained confidence in and regard for it. v. d. MARWITZ, *Posthumous Works*, II, p. 74, says: " . . . The men were tormented with it [the lance] the entire day, first dismounted, then mounted." This writer ascribes absolute superiority to the Lancer and goes so far as to maintain that, in a charge made in close order by a line armed with the saber against a line armed with the lance, it is immaterial whether in the former the men are armed with sabers or with feather-dusters. *Ibid.*, p. 172.

## 2. ORGANIZATION OF THE CAVALRY.

### (a) MINOR CAVALRY UNITS.

The principles that govern in determining the size of an *escadron* have already been given.* The escadron must be small enough to allow of its being controlled, when in combat formation, by the voice and the personal example of a single leader; it must be capable of sustaining an action independently and of performing a simple combat task. If twelve files (24 men) is assumed to be the minimum strength allowable for a platoon, we obtain, in the four-platoon escadron, which is everywhere, except in Switzerland, recognized as the proper organization, a minimum strength of 96 men. If we add to this about 30 men and horses that are not to be taken into the field, and a like number of men and horses absent on detached service, sick, etc., we arrive at a peace strength of approximately 150 troopers for the escadron. To go below this figure would curtail the independence of the escadron, in view of the casualties in horses and the numerous details to be made in the field, while, to raise this figure considerably (say to over 170 men) would reduce mobility and make supervision over trooper and horse too difficult.

The question of the organization of a cavalry regiment appears to be less free from objections. In the field, the German and French cavalry regiments have four, the English and Swiss regiments three, and the Russian and Austrian regiments six escadrons each.

In time of peace, six-escadron regiments are undoubtedly cheaper than four-escadron regiments, as fewer regimental staffs are required in the former case.† Detach-

* *Tactics*, I, KRUEGER'S translation, p. 32.

† A German cavalry division has three brigade and six regimental staffs, while an Austrian cavalry division, which has the same number of escadrons as the German, has only two brigade and four regimental staffs.

ments can be made with more or less impunity from a six-escadron regiment without thereby causing an appreciable diminution of the fighting power of the remainder. In fact, six-escadron regiments actually offer a temptation to make detachments, as they are unwieldy in difficult country, can not, even under favorable conditions, be controlled by the voice of a single leader, and necessitate the introduction of an intermediate unit between regiment and escadron, the so-called "division," consisting in Russia of two, in Austria of three escadrons.*

Four-escadron regiments are more easily managed, and are capable of deploying quickly in any direction—even from the most unfavorable formation, the column of platoons and the regimental column (mass). They can form line from route column more quickly than the six-escadron regiment (this movement taking four minutes in the former and six minutes in the latter), and their size actually demands that each regiment be kept intact and employed as one unit.

Six-escadron regiments are too strong to be assigned to infantry divisions, yet, split in two, hardly strong enough to fulfill the combat functions of divisional cavalry. When consisting of four escadrons each, regiments of the cavalry divisions can be exchanged, in case of necessity, for those attached to the infantry divisions.

Three-escadron regiments possess great mobility, but they are so weak that the personality of the regimental commander is not properly utilized.

*Thus, tactical considerations argue for four-escadron regiments, considerations of economy for six-escadron regiments.*

Cavalry can be quickly mobilized and can take the field properly mounted if its field escadrons possess, in time of peace, trained and militarily schooled mounts. The annual levy of the youngest remounts is not available for the peace cadres. Frequently a second levy, embracing the horses eliminated as unfit in the particular year, those temporarily

*In Italy one escadron from each cavalry regiment will presumably be attached to infantry divisions.

sick and others not fit to be taken along into the field, is likewise unavailable. Assuming that one-tenth of the total number of horses in service will have to be replaced annually, it follows from the foregoing that, in order to enable all units to take the field at once at full war strength, one-fifth more horses than required must be kept in readiness in time of peace—whether this be done by raising the peace strength of each escadron by one-fifth or by uniting the extra mounts into a fifth escadron in each regiment. This fifth escadron exchanges its serviceable mounts and equipment for the unserviceable mounts and equipment of the field escadrons of the regiment and then constitutes the depôt escadron. Each fifth escadron must consist of about 140 to 150 mounts in time of peace.

In Austria, each cavalry regiment has in time of peace a reserve cadre (2 officers, 5 N. C. O., 16 privates and 7 horses), which, during the period of mobilization, is expanded into a depôt escadron of 344 men and 315 horses by the transfer to it of men and horses not fit for field service from other organizations, and by recruits and remounts. As an escadron receives annually a number of remounts equal to 12 per cent. of its strength, twenty-five horses are purchased annually in order that more horses may be available for the field escadrons on mobilization. These purchase horses are then trained and, during the continuance of peace, farmed out to private parties. They are annually examined as to their serviceability and must be placed at the disposal of the organization to which they are assigned, within twenty-four hours after the order for mobilization is issued. After six years (in Hungary after five years) these animals become the property of the private persons into whose keeping they have been given. The horses for the Landwehr cavalry are provided for in a similar manner, after having been trained for five months in the organization to which they are assigned.

The brigade, consisting of two regiments, can still be controlled, when deployed in line, by the voice of a single person, the brigade commander.

### (b) MAJOR CAVALRY UNITS.

### The Cavalry Division.

Cavalry is employed either independently (in the form of cavalry divisions or cavalry corps attached to armies) or

as divisional cavalry, and, in some states, as corps cavalry. The function of independent cavalry is to defeat the enemy's cavalry, so as to make reconnaissance possible, and to operate against the flanks and rear of the enemy. In addition, it is to assist in bringing about the decision on the field of battle. Divisional cavalry is an auxiliary arm of the infantry and artillery, and, in spite of its inferior numerical strength, it also will be able to take an active part in the fight.

For a discussion of *independent* and *divisional cavalry*, see *Taktik*, IV, p. 191, et seq.

For a discussion of *divisional* and *corps cavalry*, see *Taktik*, III, p. 38, et seq.

For a discussion of the *organization of cavalry divisions* (from a strategical point of view) see *Taktik*, III, p. 53, et seq.

The Franco-German war furnished valuable lessons in regard to the strength and appropriate composition of cavalry divisions. In general, about 2.8 guns per 1,000 troopers was considered a proper proportion. Of the eight German cavalry divisions used in the Franco-German war, four consisted of three brigades and two horse batteries each, and four of two brigades and one to two horse batteries each. To the demand for great mobility and independence, properly appreciated at that time, must now be added the demand for a high degree of fire power and for an abundant equipment with the means for accomplishing demolitions and for transmitting information.

Under the present highly developed agricultural conditions of Central Europe, the cavalry division, consisting of 3,000 to 4,000 troopers, is the largest cavalry organization that, handled as one unit, can act under the control of a single leader. "The combat is the severest test of governability. The rapid course of a mounted action requires, on principle, not only that the commander be able to take in at a single glance the frontal extension of his organization, but also whatever occurs on adjacent terrain. Otherwise,

## COMPOSITION AND STRENGTH OF A CAVALRY DIVISION IN THE VARIOUS ARMIES.

| | Cavalry | Escadrons | Artillery | Special Troops | Medical Corps | Trains and Columns | Combat Strength | | | Ration Strength | | | Infantry Attached |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Rifles | Sabers | Guns | Men | Horses | Vehicles | |
| GERMANY. | 3 brigades, each of 2 regiments, each of 4 escadrons. M. G. battery. | 24 | 1 horse artillery battalion of 2 btrs. with light am. col. | 1 detachment of 32 pioneers. | | | 32 | 3,600 | 12 | 5,000 | 5,300 | 200 | Cyclist detachments when necessary. |
| AUSTRIA. | 2 brigades, each of 2 regiments, each of 6 escadrons and 1 platoon of pioneers. M. G. batteries. | 24 | 1 battalion of 2 horse batteries. | 1 cavalry Sig. Corps. detachm't. | 1 cavalry division M. C. establishment. | 1 cavalry am. col. 1 cavalry supply col. | — | 3,600 | 12 | 8,200 | 6,500 | 800 | |
| ITALY. | 2 brigades, each of 2 regiments, each of 4 escadrons. | 24 | 2 horse batteries. | | 1 Hospital Corps detachment. | Supply section and division am. col. | — | 2,800 | 12 | 4,255 | 4,180 | 169 | Cyclists when required. |
| FRANCE. | 2–3 brigades, each of 2 regiments, each of 4 escadrons. | 16 to 24 | 1 battalion of 2 horse batteries. | 1 light Sig. Corps section | 1 Hospital Corps detachment. | 1 supply column when necessary. | — | 3,600 | 8 | 4,451 | 4,526 | 210 | Provision is made for attaching dismtd. Chasseur Bns. or cyclist det's. |
| RUSSIA. | 2 brigades, each of 2 regiments, each of 6 escadrons. Mtd. sappers and 1 mtd. M. G. det. attached to each regiment. | 24 | 2 horse batteries. | | | | — | 3,600 | 12 | 4,389 | 5,103 | 311 | |
| ENGLAND. | 4 brigades, each of 3 regiments, each of 3 escadrons. | 36 with 12 M.G. | 4 batteries with a division am. col. | 4 detachments of mtd. pioneers, each of 3 off., 71 men. | 4 field hospitals. | 1 Train Co. and 1 supply col. | 300 | 4,800 | 24 and 12 M.G. | 9,500 | 9,780 | 549 | |

control and timely launching of the reserves, the principal means that the commander has of influencing the combat, are impossible. Besides, the very nature of a cavalry combat requires that, immediately after the collision of the leading lines, the reserves be available for instant and direct participation in the fight. With a mass of six regiments deployed for action, the space available will still permit the above conditions to be fulfilled.—To form a cavalry division of fewer regiments, for example of four only, is not advisable, since, in most cases, it is unavoidable to make detachments, whereby the fighting strength of the division is considerably reduced. The division would, if so reduced in strength, scarcely be equal to the problems confronting it in war. These problems are, in any case, however, not easy, and the leader of the division, even if he is talented, requires an extensive preliminary training to solve them successfully. When the division consists of more than six regiments, only eminently talented leaders, and these only when the subordinate leaders and the troops are thoroughly trained, are likely to be successful in directing it in combat."* It is not advantageous to reduce the number of escadrons in a division, because, whenever detachments are made, its fighting strength will be too greatly reduced. The leader must make the numerous detachments required for reconnaissance and the transmission of information,† harmonize with the demand of appearing as strong as possible on the battlefield. The duty of protecting message collecting stations, signal stations and trains can very properly be transferred to cyclist detachments, which can also relieve the cavalry of furnishing the relay service. The wide dissemination of the cyclist sport compels us to take advantage of it, and gives us an opportunity, after we have suffered

* v. VERDY, *Studien über Truppenführung*, IV, p. 9.

† A cavalry division may have to furnish the following: three reconnaissance escadrons, three escadrons for the signal stations and the message collecting stations, and two escadrons as escorts for the trains and columns. In this manner, one-third of the division is frittered away.

heavy casualties in horses, to mount the men that have become dismounted, on requisitioned wheels and to transport them after the cavalry division, in order to use them at least as cyclists. Mounted infantry would ever be a poor makeshift. On the other hand, the assignment of a seventh regiment to each cavalry division, this regiment to take the place of the escadrons that have been detached, is well worth considering.

The peculiar character of mounted actions would appear to make a three-unit organization desirable.* From this follows the organization of a cavalry division into three brigades, each of two regiments. Military history shows that this organization is the best, although it does not, of course, meet all the requirements of a changing situation. The mission of a cavalry force and the numerical strength of the opposing cavalry may make it necessary to augment the strength of the cavalry at one point at the expense of the forces employed at others. This is especially true where the divisional cavalry is brought up. Until the principal cavalry actions have been fought to a decision, the columns in rear must be satisfied with the minimum cavalry force with which they can get along.

When a stronger resistance is encountered, one that the cavalry can overcome but slowly by means of dismounted action and at the cost of disproportionately great sacrifices, it is advisable to attach horse artillery to the cavalry. Artillery fire is best calculated to force the enemy to show his hand. For a mounted action alone, a single battery is sufficient; for bringing a strong artillery force into action, time is usually lacking; and in battle, it is seldom necessary to prepare a cavalry charge by artillery fire, since the cavalry need only make the most of the effect produced by the other arms. When the cavalry division is launched for independent action against flank and rear of the enemy, it will not

* The organization of a cavalry division as deduced from its strategical tasks, according to v. SCHERFF; see *Taktik*, III, p. 55, et seq.

be difficult to reinforce its artillery, when necessary, with a few batteries of the army corps.* As the success of a dismounted fight depends to a great extent upon the strength and activity of the artillery, it is a good plan to assign one battery to each brigade. Nowadays, that we have the rapid fire gun, the *number* of guns is of less importance than the *number* of caissons. Three horse batteries, each of four guns (Austria), are best adapted for such assignment to brigades; caissons not required in the battery are combined into a light ammunition column to which are also assigned the seven cavalry ammunition wagons of the division.†

Similar principles are applicable to the assignment of machine gun units (consisting of three platoons, one for each brigade) to cavalry divisions. In Germany wheeled carriages are employed for transporting the machine guns; in all other states pack animals are used for this purpose. Machine guns carried on pack animals possess great mobility, offer a smaller target than those having wheeled carriages, but must first be assembled and set up before they can be used.‡

The necessity of destroying large artificial structures leads to the organization of special cavalry pioneer detachments. In Austria, for example, there is a pioneer platoon in each regiment, in Germany, one pioneer detachment, consisting of 1 officer and 32 men (on wheels), in each division. Great mounted performances can not be expected of the mounted pioneers, but good technical work should be demanded of them; they must be able to reach at a trot or gallop the designated locality where demolition work is to be done. In addition to pioneers, field signal corps detachments are assigned to a cavalry division.

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* On the morning of August 16th, 1870, the 5th Cavalry Division was reinforced by the two horse batteries of the corps artillery of the Xth Corps, so that that division, subtracting detachments made, consisted of 35 escadrons and 24 guns. *Gen St. W.*, I, p. 541.

† A German horse battery consists of 6 guns, 6 caissons and a light ammunition column for 2 horse batteries. This light ammunition column consists of 25 caissons and other vehicles.

‡ *Tactics*, I, KRUEGER'S translation, p. 261.

The necessity of having pioneers with a cavalry division appeared, for example, during the demolition, in 1870, of the bridge at Saargemünd,* and during Gurko's first passage of the Balkans.†

As trains hamper movements, the Germans do not assign them permanently.‡ It is generally much easier to supply the men of the cavalry operating in front of the army than the troops in rear. Greater difficulty is, however, encountered in supplying the horses with oats.¶ In the rarest cases only, can one count upon the country to furnish all that is required in the way of supplies.§ On its forage wagons and, as an emergency ration, in saddle bags, a cavalry division carries oats for one and one-third or at most for two days. Even in front of the army, the cavalry will not always be able to count upon the supplies of the country, but will frequently have to have recourse to the trains following the troops in rear, if it desires to avoid being hampered, by far-reaching requisitions, in its tactical movements. The formation of light supply trains for the cavalry divisions is still an unsolved problem, but an imperative necessity.

A sanitary detachment, which is to take care of the sanitary service on the battlefield, is formed of two-thirds of the personnel of the ambulances; otherwise, the cavalry has

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* KUNZ, *Kavallerie*, p. 40.

† CARDINAL v. WIDDERN, *Russische Kavalleriedivisionen*, I, p. 27. *Militär-Wochenblatt* 1908, No. 124.

‡ Loss of the field train of the 10th Hussars in the engagement at Vernon, November 22d, 1870. KUNZ, *Deutsche Reiterei*, p. 219.

¶ On the successful raid made in April 1863 by Union cavalry under Stoneman, an eight days' supply of oats and commissaries was carried along on wagons. v. FREYTAG-LORINGHOVEN, *Studien über Kriegführung*. II, p. 59.

§ Par. 475, *German F. S. R.* states: "So long as the independent cavalry (*i. e.*, a cavalry division) is in front or on the flanks of the army, it will, in most cases, have to depend upon the supplies offered by the theater of war. In order to utilize to the full all that the country affords, it may be advisable to form supply columns of requisitioned wagons. These columns are especially suited for transporting oats, reserve forage and imperishable ration articles. When ordered by the army commander, supply columns consisting of one-horse wagons and principally loaded with oats, may be assigned to the independent cavalry." See *Taktik*, IV, pp. 271 and 300, and *ibid.*, p. 191.

to depend upon the sanitary facilities of the army corps. This suffices, as the losses in a cavalry action are generally apt to be but insignificant.

The seven ammunition wagons attached to the light ammunition column suffice to replenish the first want of ammunition.

Thorough training, machine guns and a good firearm make an assignment of infantry superfluous. In colonial wars mounted infantry may occasionally do good service, but even in the Boer war, as its ability to ride increased, it very naturally did not want to forego the mounted charge. According to all experience, mounted infantry invariably degenerates into inferior cavalry; when mounted, it is helpless against cavalry, and when dismounted, it is hampered in its movements by the led horses. During the second part of the Franco-German war, the German cavalry was assigned the task of covering the siege operations against Paris, toward the south and west, where the country was broken and covered. At this time, the field operations had come to a standstill, while the rising and arming of the inhabitants constantly assumed greater proportions. This made the task of the cavalry a difficult one, and calls for infantry were soon heard from its ranks. The peculiar character of the situation and insufficient equipment of the cavalry with a firearm were responsible for this.*

Although a day's march of a small infantry command does not, in the long run, differ materially from the average day's march of a cavalry division, and it is comparatively easy to push infantry forward, after the cavalry, from one supporting point to another, cavalry only, is able to withdraw quickly from unfavorable situations. Infantry can not do this. Thus, there arises for the cavalry a conflict of duties

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* For examples from military history, see *Taktik*, III, p. 59, et seq. In regard to British mounted infantry, see *infra*, and *Tactics*, I, KRUEGER'S translation, p. 25, et seq.—Infantry may occasionally be transported on wagons, but, on account of the difficulty of assembling and moving a large number of wagons, this method of transportation is not apt to find frequent application. See *Taktik*, III, pp. 202 and 404.

—to remain with the infantry, or, in pursuing a more important tactical aim, to leave the infantry in the lurch.

Cyclist infantry best meets the requirements that must be fulfilled by infantry attached to a cavalry division. One to two companies of such cyclists might suffice for a cavalry division (see p. 15, *supra*).* It will always remain a drawback, however, that a cyclist can move but a short distance across country, and that he is, to a great extent, dependent upon the nature of the ground and the state of the weather.

Cavalry divisions should have a permanent existence in time of peace, in order that they may be able promptly to do justice to their tasks in war. They should, likewise, possess the composition that they would have in war (though this should be changed at stated periods), and the necessary administrative and executive staffs. Only when this is the case, can leader and troops learn to understand and grow accustomed to each other; only then can training according to uniform principles be accomplished. This is particularly important as the newly organized cavalry divisions will scarcely ever have an opportunity to maneuver as such after the mobilization has been ordered. The division commander can have confidence in his subordinate leaders, in his staff and in his troops only if, in time of peace, he has become personally acquainted with them and their capacity as soldiers.

"The rapid course of a cavalry action requires that leader and troops be thoroughly used to each other. It requires, further, that the leader have the highest degree of technical skill in selecting and using the various formations. It is a remarkable phenomenon that in the Franco-German war the leaders of cavalry divisions rarely decided to lead their divisions *en masse*, as battle units. Almost invariably we find these divisions disintegrated into brigades." (2d Cavalry Division at **Coulmiers.**) "No combat makes such great demands on leadership as the combat of a cavalry division, and it is our conviction that, in the field of troop-leading, there is not a more difficult problem. It is, therefore, of the utmost importance that the cavalry be given the most diverse and ample opportunities to prepare itself for war; that it do so in the organization in which it is to appear

* See *Tactics*, I, KRUEGER'S translation, p. 28. and *Taktik*, IV, p. 263.

on the theater of war; and that it be trained by the men who will be its leaders in war."*

In Germany this question has not as yet been settled. Russia has in time of peace twenty-two, France eight, and Austria six cavalry divisions.†

The difficulties that stand in the way of the permanent formation of cavalry divisions in time of peace, are partly obviated if the regiments serving in a cavalry division are constantly changed. If this is done, the fear of the creation of two classes of cavalry will be set at rest, and the drawbacks growing out of the isolation of the arm will be met. The friction that might result from the territorial limitation of army corps in regard to personnel and administrative matters, does not constitute an insurmountable obstacle to the permanent formation of cavalry divisions in time of peace.

### Cavalry Corps.‡

The Napoleonic cavalry performed the duties of a cavalry reserve in addition to those of reconnaissance; it had to be concentrated where needed, in order to direct a blow, *en masse*, at the shaken enemy.¶ In order to cover the broad front of an army in motion, the cavalry divisions must be widely extended and employed along divergent

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* VERDY DU VERNOIS, *Studien über Truppenführung; die Kavalleriedivision*, III, p. 130.

† Literature bearing on this subject: v. PELET-NARBONNE, *Über Organization, Führung, und Erziehung der Kavallerie*, 2d Ed. p. 205.

*Militär-Wochenblatt*, 1895, Nos. 27, 28, 37, 38, 44, 53 and 60.

*Jahrbücher für Armee und Marine*, October and November Nos. of 1901.

*Mehr Kavallerie*, 1903.

v. BERNHARDI, *Cavalry in Future Wars*, GOLDMAN'S translation, p. 161.

‡ v. BERNHARDI, *Cavalry in Future Wars*, GOLDMAN'S translation, p. 165.

¶ After the battle of Eckmühl (1809), the cavalry corps, consisting of the cavalry divisions of Nansouty and St. Sulpice, started in pursuit with 10 heavy and 7 light regiments.

At Krasnoi (1812), Murat had 35 cavalry regiments and 7 horse batteries at his disposal. These regiments charged, by escadron and by regiment, against the Russian division under Neworovskoi, only 7,000 men strong, and inflicted a loss of 2,000 men and 8 guns.

lines. To place the cavalry divisions that are moving over different roads and along diverging lines under the orders of a cavalry corps commander, would be useless and would frequently hamper them. This is not true when several divisions are employed in a common direction and for a common purpose. In this case, the cavalry divisions should be placed under a single commander. The lessons so far learned from military history do not favor a cavalry corps that marches, is supplied and employed as a single unit.*

When army headquarters has not as yet arrived or is a great distance away, several cavalry divisions may be placed under the orders of one commander† to take charge of the reconnaissance, to cover the concentration, to defeat the enemy's cavalry,‡ or to pursue the opponent. On the battlefield, it will often be practicable to launch several cavalry divisions, though they may occupy different positions at the start, in concert against a common objective. What a success the 5th and 6th Cavalry Divisions could have gained on the morning of August 16th, 1870, if they had been under the orders of a common commander who knew what he was about! The dictum, "March dispersed, but fight united," must here also be the guiding principle, for the rapid course of a mounted action makes it impossible to deploy a long route column against an enemy who is ready to charge.

A critical analysis of the employment of the German cavalry at the battle of Vionville shows that decisive results were only to be achieved by launching masses; that,

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* See remarks of the PRINCE OF PRUSSIA, later EMPEROR WILLIAM I, in his *Collected Works*, p. 117. In *Remarks on the Draft of a Plan of Mobilization for the year 1830*, the Prince objects to the permanent establishment of a cavalry corps, but recommends an occasional concentration of several divisions for maneuvers as a single unit.—*Aus dem Leben des Generals von Reyher*, IV, p. 61.

† For examples, see *Taktik*, III, p. 62.

‡ In 1805, five French cavalry divisions under Murat, crossed the Black Forest to deceive the Austrians and to screen the enveloping movements made by the French army.

From July 29th, 1870 until the battle of Spicheren, while the IId Army was being transported by rail, the cavalry divisions of that army the (5th and 6th) were placed under the orders of a single commander. *Gen. St. W.*, I, pp. 108 and 300.

while a charge made by an escadron or by a regiment did, perhaps occasionally, score a local success here and there, it exerted no appreciable effect on the course of the battle. The charge made by Bredow's brigade did not, as has been demonstrated, cripple the French VIth Corps. The inactivity of Marshal Canrobert was due to entirely different causes. If other cavalry had been launched, in addition to the lone Prussian brigade, a greater success would have been won at this point. A successful charge made by a cavalry regiment may perhaps have a damaging effect on the activity of a hostile division, but it will exert a scarcely appreciable influence on the action of an army. The loss of an infantry brigade through a cavalry charge is a far more serious loss to an army consisting of two or three army corps, than to an army twice that size. Therefore, if the cavalry does not wish to forego its usefulness in battle, it must appear in masses whose size increases with the size of the armies.

Cavalry charging unshaken infantry requires a broad front, so that the hostile fire can not have a concentric effect but will be distributed over a greater space. On the other hand, however, distribution in depth is also necessary, in order to add force to the shock produced by the first line,to strike deep into the hostile position, and to provide reserves, which can turn against other hostile cavalry that might possibly take a hand in the fight These various demands can be fulfilled by a mass of cavalry only . For this reason and also for the purpose of involving as large a part of the enemy's force as possible, several divisions will have to be combined for common action, if decisive results are to be obtained in battle.

The launching of large cavalry masses, however, is likewise imperatively necessary in front of the army (independent cavalry), in order to drive away the hostile cavalry and to ascertain the measures taken by the enemy. It is especially important to be superior at the decisive point. As all the powers employ their cavalry divisions in front of their

armies with the same offensive intention, each leader will have to seek to combine superior cavalry, *i.e.*, several divisions, at the point where he intends to bring about the decision, and content himself with an inferior cavalry force at the less important points. The French practice of temporarily attaching, for this purpose, the corps cavalry brigades to the cavalry in front of the army does not appear to be effective enough. It is better and more reliable to combine, at the decisive point, several divisions that are marching on different roads, and to place them under the orders of a single leader for united employment as a cavalry corps. Only by having a single leader can we avoid having too much cavalry at one point while there is not enough at another.* The inconveniences formerly experienced in employing cavalry corps disappear if such bodies are not kept in a confined space on the march, in camp and in battle. The charge that the headquarters of a cavalry corps constitutes a hampering intermediate channel between those of the divisions and the general headquarters, is unfounded, provided the leaders are well trained. The several units must be trained to send intelligence not only to the next higher headquarters but also to the highest commander and to the corps following in rear.

The necessity of forming a cavalry corps may make itself felt at various points, at the beginning of a campaign as well as during the course of the same. Instead of forming a cava ry corps directly, it would perhaps be better to meet this necessity by attaching the required executive and administrative staff to the army headquarters. The latter can then, without interfering with the composition of the division staffs, create cavalry corps.† The employment of such cavalry masses makes the assignment of supply trains absolutely necessary.‡

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* For example: The launching of excessive forces, owing to the lack of a common leader, during the reconnaissance toward Saargemünd on August 7th, 1870. A further result of this was the tardy arrival of intelligence at the proper headquarters.

† This scheme was proposed by General von Moltke after the campaign of 1866. See Moltke's *Militärische Werke*, II, p. 125.

‡ v. Bernhardi *Cavalry in Future Wars*, Goldman's translation, p. 168.

## II. THE FORMATIONS.

In the cavalry—thorough training of trooper and horse, good mounts and good morale being presupposed—combat efficiency depends to a greater extent upon tactical formations than in the infantry. The rapid course of a mounted action makes it impossible to give detailed instructions for its execution. The leader must, in many cases, content himself with simply calling out his directions. In the infantry and, to a more limited extent, in the artillery, it is practicable to correct errors in the plan of action, at least during the preliminary stage. In a cavalry action, however, it is seldom possible to make a change in movements once begun. Everything depends upon making the tactical formations fit the particular situation, and upon accustoming the troops, in time of peace, to that which promises success in battle. Formations that can not be employed in face of the enemy are superfluous. In the cavalry, more than in any other arm, all doubts as to the general principles of combat and as to the formations to be employed in action must be precluded. This is the function of drill regulations. The authorized drill regulations are the basis upon which the independent judgment of subordinate leaders must be developed, for it will depend upon their prompt and correct judgment whether, during unexpected developments in a fight, the proper action is taken. On account of the rapidity with which events occur in a mounted action, an interference on the part of the superior commander during the fight, is almost wholly precluded. Even when launching his organization into action, it will not always be possible for a commander to see everything sufficiently well from one point to

enable him to assign definite tasks to his subordinate leaders. Frequently, the superior commander will be able to control even the reserves to a limited extent only.

## 1. THE ESCADRON.*

The escadron, whether regularly formed or not, must be able to execute quickly and with precision, under all conditions and on any terrain, all movements prescribed in the regulations. Even when deployed, it must remain well in hand. Particular importance should be attached to a uniform, steady trot and to an extended gallop (especially during frontal movements); to prompt picking up and maintenance of the march direction; to precise and skillful handling of the lance; to brisk mounting and dismounting; and to swift passage from column to line, even when the direction of march is changed. In the larger units, the maintenance of order depends upon the precision and steadiness with which each individual escadron marches. "This means that the tactical unit must be independent; that it must march uninfluenced by neighboring escadrons; and that its chief, who should have it well in hand, must lead it with steadiness and precision at all times.—The escadron must maintain proper interior cohesion under all conditions. An involuntary seesawing and a dribbling away of some of the files, a deployment, must not be allowed to take place under any circumstances." (General v. SCHMIDT). Dismounted drill is restricted to the minimum in Germany. This drill is indispensible, however, for the training of the individual trooper as well as for the employment of cavalry dismounted.

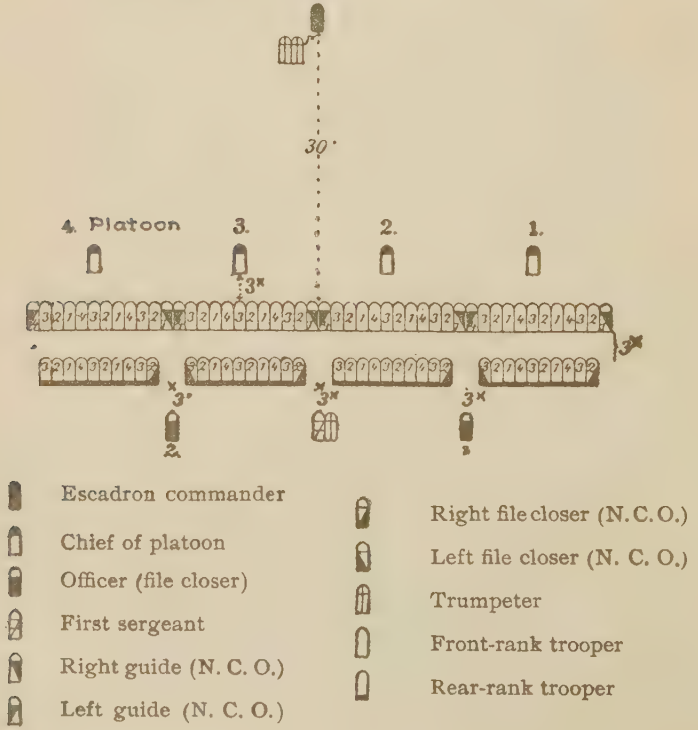
### (a) THE FORMATION OF THE ESCADRON.

The platoons, each in two ranks, are formed abreast without intervals. The guides (N. C. O.) are posted in the front rank, on the flanks of each platoon. Non-commis-

*Pars. 51-60, *German C. D. R.*

sioned file closers are posted in the rear rank, on the flanks of each platoon, the files in rear of the guides being left blank. The troopers are arranged, in each rank, according to height, from right to left.

Officers are posted in front of their units in the cavalry of all armies in order to enable them to regulate the march direction and gait, and to obtain a good view. So posted, they can be seen by all their men, just before the shock occurs, can exert an influence by personal example, and can lead their men by means of signals or commands. "In front of his unit, the officer is a leader, in the ranks, a fighter." (v. BISMARK). In this connection, it should be remembered that well-mounted officers who ride far ahead of their units during a charge, may reach the enemy all alone and may be cut down before support arrives. (Colonel v. Dolffts

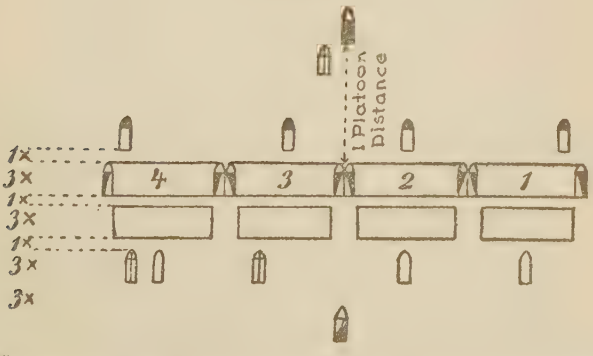


at Hainau, in 1813). The Prussian regulations of 1812 prescribed that officers should join the line in such a manner during a charge that the croups of their horses would be in the front rank. Such a decrease in speed on the part of the officers, as this regulation entailed, easily communicates itself to the organization, and it is better, therefore, to post officers closer to the line (as in Germany) and to let them fall back to the line of platoon commanders just before the charge begins (as in Austria).

The figure shown below represents a Russian escadron in line. The chiefs of the flank platoons are posted in front of the second file from the exterior flank of their respective platoons. Officers not commanding platoons are likewise posted in front of the line, to be precise, in front of the second file from the inner flank of the 1st and 4th platoons.

The platoons are divided into squads of four files each. The Russians, who still retain squads of three files each, have to count *twos* for dismounting and *threes* for forming route column. In Italy, each platoon is divided into sets of twos from its center toward either flank. In Austria, the platoons are still divided into three so-called patrols (*Patrouillen*). Platoons generally have an equal number of files and are composed, as nearly as practicable, of men and horses of the same standard of serviceability.* In Germany and Russia, the platoons retain their original numerical

**Russia.**




*In Austria and Italy, the front rank is to be composed exclusively of dark horses having no distinguishing marks.

designations, whereas, in France and Austria, they are numbered, irrespective of their original designations, from right to left when in line, and from head to rear when in column. Whenever a platoon would consist of fewer than twelve files, including guides (N. C. O.), the number of platoons in the escadron is decreased.

The center trooper of the base platoon (i. e., the third platoon from the right) is the guide of the escadron. In movements, the alignment is maintained by all the men riding forward steadily and at a uniform gait. The selection of a good man for duty as guide, and of a good horse for him to ride, is one of the most important duties of the escadron commander. The guide (center trooper) of an escadron must possess some influence over his comrades; he must be a good rider and must ride a powerful, quiet, and well trained horse. Next to the chiefs of platoons and the non-commissioned guides on the flanks of the platoons, the center trooper is the pillar of an escadron. In Italy, the chiefs of the two center platoons are to maintain the alignment by observing the escadron commander.

"The execution of eyes right or left when in motion must be completely tabooed. Proper alignment must be obtained by maintaining a steady, uniform cadence and by loose contact, and under no considerations by turning head and eyes right or left. Whenever the alignment is maintained by means of a uniform cadence, i. e., by instinct, whenever the gait is steady and the cadence uniform, one sees good lines; whenever this is not the case, and eyes right or left alone are employed, one sees poor lines and an eternal seesawing that ruins the horses. The eyes must remain, as much as practicable, straight to the front, and, as an aid to maintaining a uniform cadence, may occasionally be turned now to the right, now to the left, but never toward one side alone." *

"The base unit is responsible for maintaining the march direction, the gait and the cadence; all the other units take

*General v. SCHMIDT, *Instruktionen*, p. 111.

their distances and intervals from it. In units riding abreast, the necessary alignment is likewise obtained in this manner. The leader of the base unit is responsible for its conduct. The leaders of the other units give to their subordinates whatever directions are necessary to preserve the general alignment." (Par. 31, German C. D. R.). In large units, when intervals are not definitely prescribed, the designation of an alignment (on some base unit) is replaced by a statement showing where and how contact is to be maintained.

### (b) CONTACT AND FRONTAGE; NUMBER OF RANKS AND DISTANCES BETWEEN THEM.

*Prussia:* Under Seydlitz, the Prussian cavalry rode boot to boot; at a later date, it rode knee to knee; and since 1812, it rides stirrup to stirrup. The front of a trooper is taken as 0.80 m.

**Austria:** An interval of the width of half a hand is left between troopers. The front of a trooper is 1¼ paces or 0.93 m.

**France:** Loose touch is maintained. "They [the troopers] close in on but do not gain touch with the trooper next in line toward the center, in such a manner as to have freedom of movement in ranks." The front of a trooper is 1 m.

**Russia:** The troopers ride stirrup to stirrup. The front of a trooper is 0.80 m.

**Italy:** The front of a trooper is 0.94 m. (four troopers take up a space five paces or 3 75 m. wide). A small interval is left between stirrups of adjacent troopers.

**England:** An interval of 15 cm. is left between knees of adjacent troopers. The front of a trooper is 0.92 m.

In the German cavalry, the distance between ranks (measured from the tails of front-rank horses to the heads of rear-rank horses) is three paces (2.40 m.) in line, and one pace (0.80 m.) in column of platoons.

In **Austria, France** and **Italy,** the distance between ranks is two paces (1.50 m.).

In **Russia,** the distance between ranks is one pace (0.70 m.).

In **England,** the distance between ranks is three paces (2.40 m.) in line.

The distance between ranks used in the German cavalry, while greater than that used in most other armies, facilitates movements at the faster gaits. When the rear rank rides close upon the heels of the front rank, a horse falling down in the front rank will inevitably bring down the horse in rear of it.

*Number of ranks.* In the **Thirty Years' War,** the Cuirassiers of the Imperial army were formed in eight ranks and the Dragoons of that army in five ranks, whereas the cavalry of the Swedish army had already adopted the three-rank formation. Since the battle of **Roszbach,** the Prussian cavalry has used the two-rank formation. In the Prussian cavalry, the two-rank formation was first prescribed in the regulations of 1743.* The Swedish cavalry fought in two ranks as early as 1705. In a boot to boot charge, the troopers in the third rank hardly ever had an opportunity to use their weapons; they served to fill gaps and were likewise used for special purposes, for example, to make flank attacks. A line formed in two ranks will invariably envelop a line formed in three, provided both have the same number of troopers. A further change from the two-rank to the single-rank formation, does not seem advisable, as this would tend to impair cohesion, which the cavalry needs more than anything else when charging cavalry†. It might be well to mention that Lord Wellington objected to a second rank, even when cavalry had to charge cavalry, because it did not augment the shock power but increased disorder. Prince Frederick Charles ‡, likewise believed the single-rank formation to be the formation of the cavalry of the future.

It is claimed that the single-rank formation has greater mobility than other formations; that it facilitates movements and assembling after a charge; and that it suffers less from fire.

On the other hand, it is claimed that the single-rank formation is difficult to handle and easily pierced and that it breaks easily during movements, whereas a second rank, if provided, fills gaps occasioned by losses and resists any hostile troopers that may have succeeded in breaking through the front rank.

### (c) ELEMENTARY MOVEMENTS.

A trooper, when alone, can execute a turn on the forehand, but, when in ranks in close order, he can not do this

*At Kesselsdorf (December 15th, 1745), the cavalry of the second Prussian line was formed in two ranks, in order that it might cover approximately the same extent of front as the first line. *Geschichte des litauischen Dragonerregiments*, p. 87.

†General v. BRANDT, *Grundzüge der Taktik der drei Waffen*, 3d Ed., Berlin, 1859, pp. 42 and 222.

‡KAEHLER, *Preuszische Kavallerie*, p. 204.

as he takes up a space one pace wide and three paces deep. Wheels and ployments, executed by squads and platoons, take the place of the individual turn (exception: the about by squad executed by the rear rank when moving into bivouac. Par. 422, German F. S. R.).

To mount and dismount (pars. 73–76, German C. D. R.).

Passaging and backing (par. 102, German C. D. R.) are executed for short distances only. In Austria, Russia and Italy, the even numbers of the rear rank move two paces to the rear at the command to dismount.

### (d) GAITS.

Uniformity in the gait is of prime importance in maintaining the alignment when in motion and in simultaneously moving large masses, especially when the latter, like the German cavalry divisions, are not formed until a mobilization is ordered. The influence exerted by speed on timely arrival at the decisive point and on prompt termination of a movement must not be magnified. The decisive factors are timely commencement of a movement and correct appreciation of time and space by the leader. The leader who properly appreciates time and space will be able to move his unit at a moderate gait and without winding his horses, so as to arrive at the proper time at the point where he desires to use it. The leader who lacks this faculty will vainly rush his unit forward, at an increased gait, only to arrive too late after all. Rising to the trot* is the rule in all units. The German trot† may be employed in drills where great precision is required, for example in executing wheels. It is more difficult to obtain the gallop when ris-

*In *rising to the trot (posting)*, the rider allows himself to be raised by the thrust of one diagonal pair of legs, the right, for example, (i. e., right fore and left hind); he avoids the thrust produced by the planting of the left diagonal pair and drops back into the saddle just as the right pair is re-planted; this pair then again raises him.—*Translator.*

†In the *German trot*, the rider allows himself to be raised slightly by the thrust of each diagonal pair of legs in turn, i. e, he rides the seat we employ at the slow trot, but makes no effort to sit close; in consequence, he bumps the saddle lightly at each step the horse takes.—*Translator.*

ing to the trot than when using the German trot, as the horse can not be gathered so well in the former as in the latter case.

The mobility of an organization is influenced by the load carried by the horses, by training, by previous exertions, by feeding, and by the character of the ground. When some speed is required, it is best to employ a steady short trot; when considerable speed is required, a smooth gallop (the horses taking long strides without rushing and assuming an unconstrained, natural position), as these gaits produce the least fatigue.

The following table shows the distances covered at the various gaits per minute:

| | Walk. | | Trot. | | Gallop. | | Accelerated Gallop. | |
|---|---|---|---|---|---|---|---|---|
| | Paces. | m. | Paces. | m. | Paces. | m. | Paces. | m. |
| Germany | 125 | 100 | 275 | 220 | 500 | 400 | 700 | 560 |
| Austria | 140 | 105 | 300 | 225 | 500 | 375 | —— | —— |
| France | —— | 110 | —— | 240 | —— | 340 | —— | 440 |
| Italy | —— | 100 | —— | 250 | —— | 350 | —— | 450 |
| England | —— | 106 | —— | 214 | —— | 400 | —— | —— |
| Russia* | —— | 89 to 106 | —— | 212 | —— | 283 | —— | 425 |

A short trot that does not strain the lungs and an extended gallop are used everywhere. The gallop is particularly well developed in the German cavalry, which, with its accelerated gallop, covers 120 m. more per minute than the French cavalry with its *gallop allongé*, and 135 m. more per minute than the Russian cavalry with its "field gallop." In charging over 1,500 m. of open ground, against infantry, a German escadron would be exposed to fire for 2 minutes and 37 seconds, a French escadron for 3 minutes and 24 seconds, and a Russian escadron for 3 minutes and 32 seconds. The short distances covered per minute by the Russian cavalry are due to the attempt to harmonize the performance of a mount in the cav-

*Instead of at the gallop, the Cossacks ride at an accelerated trot. This may be increased to the so-called *Namjot*, a species of lope in which 283 m. are covered per minute. The accelerated *Namjot* corresponds to the "field gallop" of the cavalry of the Line.

alry of the Line with that of the smaller Cossack horse. In France, training is to be so regulated that horses will cover 10 km. at a trot, or 6 km. at a gallop without exertion. No definite figures can be given for distances covered per minute at top speed, as allowance must be made, in a unit in close order, for the weaker horses, whose performance is more reduced by exertion and by difficult ground than that of the stronger horses. The Russians count on covering 800 paces (565 m.) during the first minute of riding at top speed.

According to Austrian observations, the distances covered per minute on soft ground in the field, are as follows:

At a walk, 90–96 m.

At a trot, 150–160 m. This may be continued up to 30 minutes = 4,800 m.

At a gallop, 260–280 m. This may be continued up to 5 minutes = 1,400 m.

At top speed, 370–400 m. This may be continued up to 1 minute = 400 m.

The work a horse is capable of performing is limited by the exhaustion of its lungs and muscles. The lungs become exhausted first, the muscles next. A horse, when quiet, takes eight to twelve breaths per minute; after going at top speed, however, it takes 130 breaths per minute.*

The following table shows the number of respirations that a horse takes per minute:

| *Without kit:* | | *With field kit:* | |
|---|---|---|---|
| Slow walk | 16–24 | Ordinary walk | 30–39 |
| Lively walk | 34 | Walk uphill | 34 |
| Trot, after 1 km. | 42 | Walk downhill | 28 |
| Trot, after 2 km. | 46 | Trot, after 1 km. | 56 |
| Trot, after 3 km. | 51 | Trot, after 2 km. | 60 |
| Trot for longer distances, up to | 65 | Trot, after 3 km. | 62 |
| Gallop for 1 km. | 55 | Trot for longer distances, up to | 79 |
| Gallop for 3½ km. | 72–84 | Trot uphill | 74 |
| Top speed for 300 m. | 58 | Trot downhill | 55 |
| Top speed for 1 km | 60–72 | Gallop for 1 km. | 74 |
| Top speed for longer distances, up to | 130 | | |
| Finally: Congestion of the lungs. | | | |

The trot over soft ground imposes the same strain on the lungs as the gallop over hard, level ground.

Fast gaits uphill tire principally the lungs, fast gaits downhill the muscles and joints. Soft ground tires lungs and muscles and affects particularly the sinews, hard ground principally joints and hoofs.

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*Fieldmarshal, Lieut. Gen. CONRAD V. HÖTZENDORF, Chief-of-Staff of the Austro-Hungarian Army, *Zum Studium der Taktik*, p. 748.

Upon halting, the number of respirations decreases rapidly, the rate of this decrease being directly proportional to the speed with which the horse moved. If a horse shows 55 respirations after traveling 1 km., this number, upon halting, drops in 5 minutes to 45, in 10 minutes to 28, and in 20 minutes to 17. This clearly indicates the necessity of rests or of coming down to a walk for corresponding periods. The breathing, recognizable by the heaving of the flanks, is an index of the remaining energy in a horse.

Lungs and muscles are tired least by the walk. This gait promises, therefore, the greatest endurance on the part of the horse. A horse will walk ten hours a day without considerable fatigue. This is equivalent to 6,000 m. per hour or 60 km. per day. But, to ride continually at a walk tires the trooper and causes him to lounge in the saddle, which produces a deleterious effect on the horse.

If nothing but the trot were used in covering long distances, the horses would soon become exhausted. Therefore, walk and trot are used alternately.

A fast gallop in itself exhausts horses suddenly; after such an exertion they require from ten to fifteen minutes to recover, to reestablish the normal action of the lungs. General Bonie of the French army considers 5,000 m. to be the maximum distance that a horse can gallop at a single stretch on one day. For some time after such a performance, however, a horse can move only at a walk. At **Vionville,** v. Bredow's brigade rode 5,500 m. at top speed. General v. Schmidt* says: "It is absolutely essential that the horses gallop quietly and steadily. They must not gallop hurriedly and violently, change from one lead to the other, and throw their riders about in the saddle, for this not only causes disorder in ranks and loss of cohesion in the line, but makes the movement more difficult for the horses, exhausts them prematurely and deprives them, on account of their excitement, of their wind, which they need more than anything else —The gallop stride must go flat and evenly over the ground and must be without high action.—The troopers must sit still, press the crotch firmly down into the saddle and must not flounder about. They must let their lower legs hang quietly down the sides of their horses so that the latter are in no way disturbed and excited either by the seat or by the position of the legs. They must, further, closely conform with their bodies to every movement of their horses, must have a light hand, giving and taking rein when necessary, and must make every effort to keep their mounts down to a uniform, long stride. After a few drills, the horses will no longer become excited nor be in the air, and will gallop in good balance, quietly, without hurry and without rushing forcibly into the bit. Both trooper and horse must simultaneously learn to keep their wind, coolness and temper, and acquire a natural, free and unconstrained carriage. Horse and trooper must give one the impression that this extended gallop is easy and pleasant; that they enjoy it; and that they are in a perfectly unconstrained, natural position."

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**Instruktionen* p. 43.

"This is the only way in which the escadrons can be kept from increasing the gait to top speed against the will of their leaders and that of the troopers. Such headlong rushes can occur only when the gallop during the charge is violent, hurried and unsteady; then the ranks become disordered and cease to exist entirely, so that finally six, eight, and perhaps ten ranks are formed: this is the gravest fault in the shock."*

### (e) GENERAL PRINCIPLES FOR MOVEMENTS.

### 1. Commands, Orders, Bugle and Visual Signals, and Verbal Directions.

Cavalry is led by means of commands, orders, bugle and visual signals, and verbal directions. Leader and organization should keep each other constantly in view. Commands should be given only when the leader is certain that they will be understood; generally speaking, they can not be employed in organizations larger than an escadron. In large units, commands are replaced by orders or by verbal directions. For transmitting orders quickly, the regimental commander may avail himself of his adjutant and his orderly officer. If he does this, his orders can simultaneously reach both flanks of the regiment.

Bugle signals, whose number is rather limited in Germany, enable the leader to communicate his will quickly and thoroughly to the troops. Bugle signals should not be used when they might betray the presence of the organization or cause misunderstanding in other units. A bugle signal is executed as soon as it is understood, i. e., the units should "ride to the tune of the bugle signal" (*in das Signal hineinreiten*). The most important bugle signals are "front" (*Front*),† "assemble," and the "regimental call"

*Ibid., p. 45.

†"The signal 'front' is employed:

"(*a*) To cause a line, a line of escadrons in columns of platoons, or a regimental column (mass) that has wheeled to a flank or to the rear by platoons, to resume the original march direction;

"(*b*) To cause a double column or a column of platoons to face toward the front (i. e., toward the enemy) by wheeling into line by platoons, or a route column to face toward the front (i.e., toward the enemy) by wheeling into line by squads;

"(*c*) To cause a route column that is moving to the rear into a defile, to resume the original march direction;

"(*d*) To cause a unit that is moving to the rear in extended order, to face again toward the enemy.

"Whenever the execution of the signal necessitates a wheel or a turn to the rear, the wheel or turn is made to the left about." (Par. 21, *German C. D. R.*).

(*Regimentsruf*),* a special one being prescribed for each regiment. The regimental call is to be used in critical moments when no time is available for giving orders or commands. Its purpose is to cause the eyes of all to be directed upon the leader. The organization must be trained to form for attack in correct formation and in the proper direction at a signal from the leaders, and must follow in trace as soon as the latter move off.

Visual signals are used to lead troops silently. Before giving such signals, the leader may attract the attention of his men by means of a blast on the whistle. As visual signals can not be seen by all the troopers when in route column, they are repeated by all subordinate leaders down to and including chiefs of platoons. Visual signals and verbal directions are valuable when the enemy is to be surprised. It must be remembered that such signals do not always ensure the simultaneous and orderly execution of movements. It is of the utmost importance that each unit follow its leader wherever he moves. In front of the enemy, we must absolutely rely upon each trooper's following the lead of his commander. The leader indicates by raising his arm, that his unit is to follow him without command or signal.

### 2. Wheels and Turns.

The regulations prescribe *wheels*† (on fixed pivot), such as *wheel into column*,‡ *wheel into line*,¶ and *about wheel*,§ by platoons and by squads, and *turns*‖ (on moving pivot), i. e., changes in the march direction without change in the formation. (Pars. 36–39, German C. D. R.). Wheel are executed at angles of 90 and 180 degrees, and turns (changes

*Par. 23, *German C. D. R.*
†*Schwenkungen.*
‡*Abschwenken.*
¶*Einschwenken.*
§*Kehrtschwenkung.*
‖*Drehungen.*

of direction) at any angle. Turns may be executed by command or by signal at angles of 45 or 90 degrees. During turns, the chief of the base platoon maintains the cadence. The other chiefs of platoons and troopers or units diminish or increase the cadence, according to their position, or change the gait when necessary. The leader of the base platoon (or base unit) may be directed to decrease the cadence when necessary.

### 3. Deployments and Front into Line.

The term deployment, as used in the regulations, denotes the change from one of the deep columns of the regiment to a broader combat formation, for example, the change from column of platoons to line of escadrons in columns of platoons. Line may be formed from column by executing front into line. In the deployment as well as in front into line, the units in rear habitually place themselves on both flanks of the leading unit, the second and third to its right, the others to its left. The distances to be traversed by the units in rear may be decreased by first changing the march direction and, simultaneously therewith, deploying or executing right front into line or left front into line, as the case may be, in the direction in which the turn is made.

The deployments and front into line are executed as follows:

If halted or if marching at the walk, at the trot;

If marching at the trot, at the gallop; and

If marching at the gallop, at the gallop.

In the deployments, if executed from the halt (or while marching at the walk), the base unit advances the distance prescribed or ordered in the particular case, at the trot, and then halts (or comes down to the walk); if executed while marching at the trot or at the gallop, the base unit advances the distance prescribed or ordered, without changing the gait, and then comes down to the next slower gait, or, if deploying from route column, comes down to the

walk. In forming front into line from a halt (or while marching at the walk), the leading element advances twenty paces at the trot and halts (or comes down to the walk); if executed while marching at the trot or at the gallop, the leading element continues to advance without changing the gait.

*By halting the leading element, the deployment is accelerated, and gain of ground to the front is avoided.*

Changes from one formation to another, in so far as they do not involve the execution of front into line, and ployments (habitually executed on the base unit) seldom require haste. Therefore, such movements are executed without changing the gait.

### (f) MOVEMENTS OF THE ESCADRON IN LINE.*

The line is the most important formation of the cavalry, as it is the formation in which the charge is made. It is essential in all movements made in line that the horses be perpendicular to the front and that accurate contact be maintained between stirrups. The march direction can be maintained, after a charge is once begun, only when this principle is observed. The front-rank men take care to maintain proper contact, while the rear-rank men preserve the proper distance and cover in file. The center trooper (guide of the escadron) follows at the prescribed distance in the trace of his chief of platoon. In Austria, when marching at fast gaits, rear-rank troopers are permitted to ride so as to cover the intervals between front-rank men.

The oblique (used for short distances only) is executed by each trooper making a half turn individually, and marching at an angle of 45 degrees to the original direction.

Changes of front are effected either by executing turns or by the leader of the base unit's marching upon a new objective point, the rest of the escadron gradually conforming to the movement.

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*Pars. 78-80, *German C. D. R.*

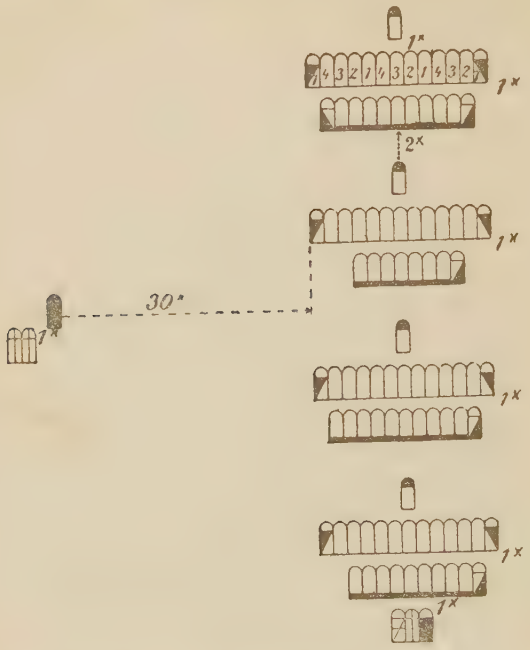
If the escadron is to move to the rear, the platoons execute an about wheel (in Russia the about wheel in this case may be executed either by threes or by platoons). At the signal "front," platoons wheel to the left about and face again toward the enemy. The term "front" denotes the side on which the leader is posted.

### (g) THE COLUMNS OF THE ESCADRON.

#### 1. Column of Platoons.

Cavalry must be able to form line from column quickly in any direction. For this reason, columns must be open, narrow and not too deep. In addition, they must be capable of changing direction easily, and the distance between ranks in the various elements must be sufficient to enable the horses to gallop comfortably, and to prevent disorders occurring in any one subdivision from being communicated to others. In a close column, the dust raised settles very slowly and the horses can not see where they are stepping; in consequence, they fall and, at the faster gaits, order is easily lost. It is not advisable to increase the distance between ranks as the formation of line is thereby retarded. The column of platoons meets all the requirements of an assembly and principal march formation of an escadron on the battlefield. Line may be quickly formed in any direction from column of platoons, by first partially changing direction. In passing defiles, the files on the flanks are broken off and follow their platoons. (Par. 93, German C. D. R.). When this is done, care must be taken that elongation of the column does not take place. In Austria, entire squads break from the flanks, in France, as many files as required. Column of platoons is formed either by wheeling into column or by ploying. The last-named movement is habitually executed on the center platoon, i. e., the base platoon, in exceptional cases, on a flank platoon. When the column of platoons is to be given a different march

direction than that obtainable by wheeling into column, the march direction is indicated in the command. In column of platoons, the platoons are in rear of and covering each



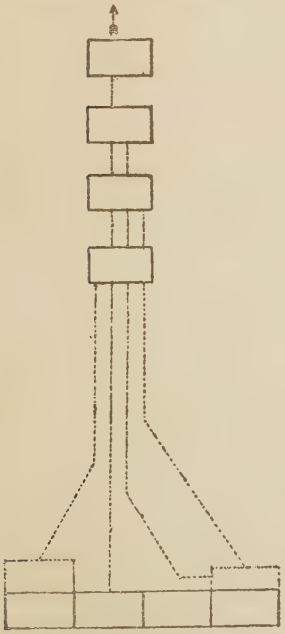

other; the rear rank in each platoon is one pace in rear of its front rank; the chiefs of rear platoons follow the next preceding platoon at a distance equal to the front of their platoon less eleven paces; the center trooper of each platoon follows at one pace distance in the trace of his chief of platoon.

The eleven paces, mentioned above, are obtained by adding to the depth of one platoon (3 + 1 + 3 paces), the depth of the horse (3 paces) of the chief of the next platoon in the column, and the distance of that chief from his own platoon (1 pace). To enable the horse of a chief of platoon to move at fast gaits, it must be at least one pace from the next preceding platoon. Moreover, rear platoons must be able to wheel into line. Hence, the front of a platoon must not be less than twelve paces. Since each trooper occupies a front of one pace, the minimum strength of a platoon is thus obviously twelve files.

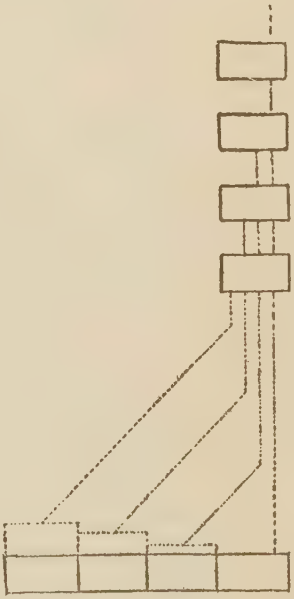
In France, the distance in the clear between platoons amounts to half platoon front. The platoons can wheel into line when each consists of twelve to thirteen files, but not when each consists of a greater number of files. When each platoon consists of eighteen files (each file occupying a front of 1 m.), the distance in the clear between platoons is 9 m. and the depth of the two ranks of each platoon 6 m. Hence, when the platoons wheel into line, three files in each platoon find no room, as the platoon front amounts to 18 m. while the distance between platoons plus the depth of a platoon is 15 m. only.

In other armies, the rear ranks in column of platoons preserve the same distance from the front ranks as in line. In Austria and France, in forming column of platoons on a flank platoon, the latter moves straight to the front, the second platoon executes two wheels, each of 45 degrees, the third and fourth each a quarter wheel, each platoon then following the leading platoon.

**Forming Column of Platoons from Line, on the Center Platoon.**



**Forming Column of Platoons from Line, on the Right Platoon.**

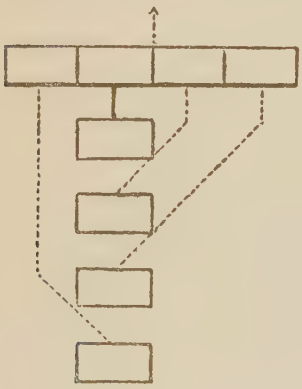


Cavalry should be able to deploy in any direction for attack. Hence, all ideas of the drawbacks of inversion should be abandoned. It is essential that the platoons be

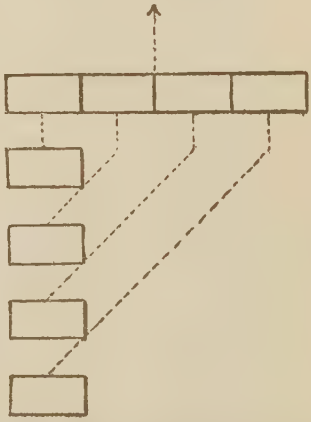
able to wheel into line to the right as well as to the left, and that they be able to form front into line irrespective of the numerical order in which they happen to be. The term "front" always denotes the side of the column on which the leader is posted. It is immaterial whether the first or the fourth platoon is on the right flank in line.

This apparently simple principle has only recently received general recognition in the cavalry, least of all in armies where the number of a unit changes with its position. At **Möckern,** October 16th, 1813, the Lithuanian Dragoons, after charging hostile cavalry, had wheeled about by platoons and then wheeled to the right by escadrons in order to charge, in echelon, retreating French infantry. "By charging with inverted platoons and inverted escadrons, such confusion had been created, that a single hostile escadron would have sufficed to rout the entire regiment. After the fight, I was compelled to post the first sergeant of the Jäger Escadron where the right was to rest and then gradually to form one escadron after another into line."*

**Right and Left Front into Line from Column of Platoons.**



**Right Front into Line from Column of Platoons.**



Line is formed from column of platoons either by executing front into line or by wheeling into line. It is simpler to wheel into line than to execute front into line, as contact, alignment and march direction are more easily maintained, the pivot flanks of the platoons being already in the new line

*Graf HENCKEL v. DONNERSMARCK, *Erinnerungen aus meinem Leben*, p.229.

Besides, a simple command of the escadron commander suffices for wheeling into line, whereas several commands of the chiefs of platoons are required to execute front into line. Moreover, especially at the fast gaits, it is easier for the troopers to wheel than to oblique, and, in addition, the hesitation on the inner and the rushing on the outer flanks, the seesawing of the line, when executing front into line toward one flank only, is avoided. But, when only a short distance separates the organization from the enemy whom it is to charge, wheeling into line makes it more difficult to put the horses into a fast gait. The manner of forming line is of less importance in an escadron than in larger units. If the leading element continues the march while front into line is being executed, the deployment is retarded, but the distance to the objective is reduced. When, on the other hand, the leading element halts, or changes direction, while the remaining elements wheel into line, the deployment is accelerated, but the distance to the objective is not reduced.

Front into line is habitually executed by the rear platoons placing themselves, at the commands of their leaders, to the right and left respectively of the leading platoon. In exceptional cases, right front into line or left front into line may be executed. This is especially true if the march direction is changed at the same time, when the rear platoons execute right front into line or left front into line, as the case may be, in the direction in which the turn is made. In the Russian and the French cavalry, right front into line and left front into line alone are used. In the Austrian cavalry, the second platoon places itself to the right and the other platoons place themselves to the left of the leading platoon. In France, the escadron commander, by placing himself either on the right or on the left of the leading platoon, indicates whether right front into line or left front into line is to be executed. The advantages of simultaneously executing right and left front into line are obvious. When executing right and left front into line, the leading platoon remains the base platoon; its chief can, without difficulty,

maintain the march direction: the gait is steadier during the movement and order is more easily preserved; and, finally, line can be formed more quickly than when front into line is executed toward one side only. Right and left front into line, simultaneously executed, has the disadvantage that, in certain circumstances, a platoon that is led by a chief who possesses little skill or one who is not well mounted, may become the base platoon.

Right and left front into line follows quite logically from the ploy-ment on the center platoon. In an escadron, it is immaterial how front into line is executed, as the time that could be gained is insignificant. It is simply a question of maintaining a principle that applies to the regiment and is logically also extended to the escadron. For mention of a further drawback of right and left front into line, see p. 71, *infra.*

The following will give an idea of the time required to form front into line from column of platoons when each platoon consists of twelve files:

Right (or left) front into line at the trot requires 21, at the gallop 14 seconds;

Right and left front into line at the trot requires 15, at the gallop 12 seconds;

Platoons front into line from column of fours (each platoon forming front into line) at the trot requires 18, at the gallop 9 seconds.

Hence, front into line from route column, under favorable conditions, requires, at the trot 33, at the gallop 21 seconds.

On the other hand, to wheel into line when the leading platoon has changed direction (90 degrees), requires, at the trot 16, at the gallop 10 seconds.

### 2. The Echelon Formation.

The German C. D. R. of 1909 no longer prescribe the "echelon formation" (the so-called "half-column"), in which the platoons were posted so as to uncover each other wholly or in part. The formation was valuable in training leaders and troops in riding accurately; it could scarcely

be said to be suitable on the battlefield for the purpose of gaining the flank of the enemy.

Orderly movements in this echelon formation are practicable only when the terrain is open and when the platoon leaders are carefully trained. Each platoon leader follows his own march direction, and cohesion during the movement can be maintained only by close observation of the distance from the next preceding platoon. If the rear platoons close up too much, they can not wheel into line; if they lose distance, and this is the most common error, the alignment, on forming line, is lost. Another drawback, finally, was caused by the fact that the position of the non-commissioned guide on the outer flank of each platoon was not fixed, but depended upon the number of files in his platoon. The only way in which the echelon formation could be taken up from line by wheeling, was in a direction making an angle of either 45 or 135 degrees with the original front; whereas column of platoons can be formed in any direction. When in echelon formation, the march direction can be changed only by first forming column of platoons.

In echelon formation, it is difficult to utilize cover and to avoid obstacles.

*To form line from echelon formation.* When executing right and left front into line from column of platoons, the leader of the base platoon is already in front with his platoon and need only continue to maintain the march direction, whereas, in forming line from echelon formation, he is the second to reach the line, whereby the maintenance of the march direction is endangered. When in echelon formation, the escadron can form line at once in three definite directions only, whereas, when in column of platoons, the escadron, by first partially changing direction, can quickly form line in any direction toward the front or half front.

## Single-Rank Formation.

In order to minimize losses, the escadron when in line, or the platoons when the escadron is in column of platoons, may be formed in single rank. (Par. 98, German C. D. R.). The platoons, when the escadron is in column of platoons, may also be formed in single rank when attacking infantry, artillery, or machine guns. (Par. 113, German C. D. R.). Single rank is formed by the rear-rank troopers placing themselves with or without an interval to the right of their file leaders. The troopers must be trained

to form single rank from route column and from column of platoons. If an escadron consisting of 120 troopers forms single rank with an interval of one pace between troopers, it will cover a front of 240 paces, i. e., approximately the same front as a regiment in line.

### 3. Route Columns.

Cavalry marches either in column of twos or in column of fours, as side roads average from two to three, main roads from five to seven paces in width. In column of fours, the

**Germany.**

**Column of Fours.** **Column of Twos.**

various sets of fours follow each other without distance, the rear-rank troopers in each squad covering the intervals to the right of their file leaders. Thus, the front-rank troopers in each squad but the first, cover the front-rank troopers in the next preceding squad, the rear-rank troopers in each squad but the first, covering the rear-rank troopers in the next preceding squad. In column of twos, the half-squads follow each other in a similar manner. More than two men are never allowed to ride abreast in column of twos, except where the chiefs of platoons are posted.

Route column is generally formed by first forming column of platoons and then by ploying on a flank squad (in Italy by ploying on a center squad, in France by habitually ploying on the right squad, i. e., by executing right forward, fours right). Route column may also be formed by wheeling by squads. As each squad is four paces wide and six paces deep (when the rear rank follows the front rank without distance), the squads can not wheel simultaneously into column, but must follow each other successively. The change from column of fours to column of twos is effected by ploying. Platoons front into line from column of fours is executed simultaneously by the platoons, or successively (for example on debouching from a defile).

Line is formed from route column in a similar manner as from column of platoons. When the escadron is in route column and it is impracticable to form line in the usual manner, line may be formed quickly toward a flank by the command "Right" (or "Left") "Front," given by the escadron commander, or by the signal "Front," at which command, or signal, the squads (or half-squads) wheel into line and close in while riding forward at the trot.

Since a squad as well as a half-squad is six paces deep, but the former four, the latter two paces wide, gaps of two and four paces respectively occur when line is formed by wheeling by squads. These gaps must be closed by the troopers' closing in toward the center. The regulations of all the other armies prescribe that, in forming line to a flank, each platoon is first partially to change direction and then to form line.

In order to decrease the depth of route columns, fours (or twos) follow each other without distance in the German cavalry. This practice interferes with riding at fast gaits, but accelerates the formation of line. Disorders are easily communicated to the entire column, whose depth prevents the leaders from exerting as much influence over their men as in other formations. Moreover, when speed is required, it will, as a rule, be necessary to use a formation that permits line to be formed with despatch (column of platoons, for example, the flank files being broken off when necessary).

On June 28th, 1866, the 3d Cuirassier Regiment received orders to march to Königinhof with one horse battery and one field battery. The batteries finally found the road impracticable. The three escadrons that marched in rear of the batteries wheeled about and moved to the rear at the trot. As it was almost dark and the path was steep and covered with stones, a number of horses in the escadrons stumbled and fell here and there. The gaps occasioned thereby caused the troopers in rear to gallop ahead to close up, whereby the outposts of the Ist Army Corps, which could not account for this unexpected return of the column, were alarmed. The panic of the Bavarian cavalry at **Hünfeld** and **Gersfeld** likewise occurred in route column. *

In other armies fours and twos cover in file. In **Austria, France** and **Italy,** the distance between fours (or twos) is 0.75 m., in **England,** 1.20 m. In practice, the distance of one pace between fours (or twos) is generally increased, as it is difficult to maintain. The French regulations therefore count on an elongation of from one-sixth to one-fourth of the depth of each escadron, but permit a reduction or total elimination of the distance between fours or twos (*"les cavaliers peuvent même gagner du terrain à droite ou à gauche de ceux qui les précèdent"*).

An escadron of 148 troopers, when formed in column of fours in the German manner, has a depth of 97 m., and when formed in column of fours in the Austrian manner, a depth of 124 m. This difference of 27 m., while of little importance in a single escadron, must be reckoned with in larger units, as it retards the execution of front into line. This movement is very apt to be still more retarded, because the distance between fours is more likely to be increased than diminished. The German escadron in column of twos has a depth of 178 m., the Austrian a depth of 233 m. There is thus a difference of 55 m. between the two.

The **Russian** cavalry uses the column of threes and the column of twos as route columns. Each rank turns independently by threes (or forms column of sixes—the so-called "turning column," the route column

*See v. LETTOW-VORBECK, *Krieg von 1866*, III, pp. 82 and 105; *Neue militärische Blätter*, 1902, I, p. 97, *Queckmoor und Gersfeld*.

used on wide roads), the rear-rank troopers following and covering their file leaders. In Austria, the turning column is also used for moving a short distance to a flank. Route column may likewise be formed by ployings. Column of twos is formed from column of threes in the same manner as column of twos from column of squads in the infantry. Aside from the disadvantage of counting off twice (i. e., counting twos for dismounting and threes for forming route column), the column of threes is longer than the column of fours. As the distance between sets of threes is one pace (0.71 m.), the depth of an escadron in column of threes amounts to 151 m., as against 97 m., the depth of a German escadron in column of fours.

The **Italian** cavalry uses the most logical procedure, in that the principle of forming column of platoons on the base platoon, and front into line on both flanks of the leading element, has been extended to forming route column and platoons front into line from route column. The senior non-commissioned officer of a platoon rides directly in rear of his chief of platoon, the next ranking non-commissioned officer of the platoon riding in the rear rank and covering the senior non-commissioned officer. Thus, if the chief of platoon should be disabled, he can be replaced in the simplest manner.

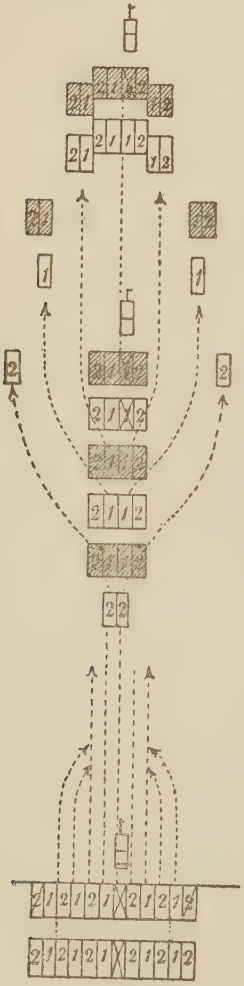
The two junior non-commissioned officers of the platoon are posted on the flanks of the front rank of the platoon. The platoon is then divided into sets of twos, from the center toward each flank, the "center trooper" (the senior non-commissioned officer) counting as number one. In forming column of fours, the four files in the center of the platoon ride straight to the front; they are followed by the two files next on the right and by the two next on the left, these forming a new squad in rear of the former center squad, and so on. Front into line is executed by each two files on the right of each squad placing themselves abreast and to the right of the leading squad, each two files on the left of each squad similarly placing themselves abreast and to the left of the leading squad. When the column is to form line to the right or to the left, the chiefs of platoons turn the heads of their platoons in the indicated direction, and each platoon then executes front into line as explained. In forming column of twos from column of fours, the exterior files of each squad place themselves in rear of the center files of their squad.

A difficulty can arise only when the route column has faced to the rear and then executes front into line. In this case, front into line must be executed by half-platoons, the last half-platoon moving abreast of the one in the lead.

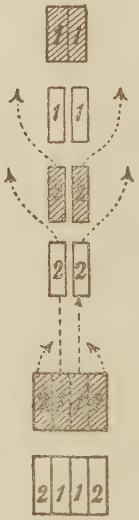
In the **English** cavalry, column of fours is formed in a similar manner as in the Italian cavalry, the squad on the right of the center trooper moving out first.

## Italy.

### Forming Route Column and Front into Line.



### Forming Column of Twos from Column of Fours.



## 2. THE REGIMENT.

### (a) THE FORMATIONS.*

The regiment consisting of from three to five escadrons, can be led directly by its commander, and, if con-

*Comparison: *The Formations of the Regiment:*

| France. | Germany. |
|---|---|
| 1. **Line:** The escadrons, each in line, are abreast at intervals of 15 paces. | 1. **Line:** The escadrons, each in line, are abreast at intervals of 6 paces. |
| 2. **Line of Escadrons in Columns of Platoons** (*Ligne de colonnes*): The escadrons, each in column of platoons, are abreast at deploying intervals plus 15 paces. | 2. **Line of Escadrons in Columns of Platoons** (*Eskadronskolonnen*): The escadrons, each in column of platoons, are abreast at deploying intervals plus 6 paces. |
| 3. **Mass:** The escadrons, each in column of platoons, are abreast at intervals of 15 paces. | 3. **Regimental Column** (*Regimentskolonne*): The escadrons, each in column of platoons, are abreast at intervals of 6 paces. |
| 4. **Column of Platoons** (*Colonne de pelotons*): The escadrons, each in column of platoons, are in rear of each other at a distance of 23 paces. | 4. **Column of Platoons:** The escadrons, each in column of platoons, are in rear of each other at a distance of 6 paces. |
| 5. **Column of Escadrons** (*Colonne d'escadrons*): This is a line of escadrons in columns of platoons that has wheeled to a flank. The escadrons, each in line, are in rear of each other at full distance (68 paces), half distance (38 paces), or close distance (23 paces). | 5. **Double Column:** The escadrons, each in column of platoons, are formed two and two abreast. |
| 6 **Double Column:** The escadrons, each in column of platoons, are formed two and two abreast at 15 paces interval. The distance between the leading two escadrons and the rear two is 23 paces. | 6. **Route Column:** Column of twos or column of fours. No distance between fours or twos. The distance between escadrons is 8 m. |
| 7. **Route Column:** Column of twos or column of fours. The distance between twos or fours is 0.75 m., between escadrons, 12 m. | 7. **Open Formations.** |
| 8. **Line of Platoons in Columns of Fours** (*Ligne de pelotons par quatre*): This is formed by ploying from line. The distance between fours is 1.50 m. | |

ditions are not too unfavorable, can be controlled by his voice. The regiment is not too large for the regimental commander to make his influence felt.

The evolutions of the regiment, especially its combat exercises, are designed to weld the escadrons into a homogeneous whole, to train the escadron commanders to act on their own initiative in accordance with the situation, and to prepare the regiment for its duties as a part of a larger organization. (Par. 116, German C. D. R.).

Escadron commanders are responsible for the maintenance of cohesion in and the correct execution of movements by their escadrons. Escadron commanders should foresee fluctuations in the evolution executed by the cavalry force of which their escadrons form a part. Each escadron commander must prevent those fluctuations from being communicated to his own escadron, or cause them to be gradually adjusted while the movement is in progress. (Par. 122, German C. D. R.).

When, as will frequently happen, the voice of the regimental commander does not suffice for giving commands for the execution of evolutions, recourse must be had to orders. For their transmission, the regimental commander has at his disposal the adjutant and one orderly officer.

### 1. The Regiment in Line.*

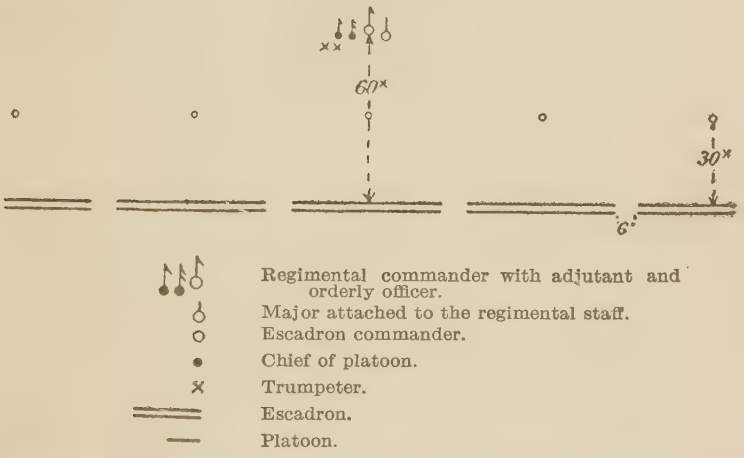
When the German regiment is in line, the escadrons, each in line, are posted abreast of each other at intervals of six paces (4.8 m.). In the Austrian regiment, the interval between escadrons in line is 7.5 m., (between "divisions"—so-called—in line, 22.5 m.†), in the French‡ and Italian

*Par. 127, *German C. D. R.*

†If the regiment is in one of its columns, the interval between "divisions" is reduced to ten paces (7.5 m.).

‡On account of this interval and the loose touch maintained by the French troopers, a French regiment overlaps a German regiment by one and one-fourth times escadron front, provided the two regiments considered are equal in strength.

regiments, 12 m., in the English regiment, 7.3 m., and in the Russian regiment, platoon front. The line is the combat formation of cavalry. It can not be handled with suf-




ficient ease to permit march direction or front to be changed quickly at a fast gait. It is best adapted for moving straight to the front or straight to the rear. When a charge is contemplated, line should not be formed until the organization is facing in the direction in which the shock is to be delivered.

### 2. Line of Escadrons in Columns of Platoons.*

When in line of escadrons in columns of platoons, the regiment possesses greater readiness for combat than in any other formation, barring line. Line of escadrons in columns of platoons is taken up when evolutions are no longer necessary and when the regiment is facing in the direction in which it is to attack. This formation once taken

*Eskadronskolonnen.*

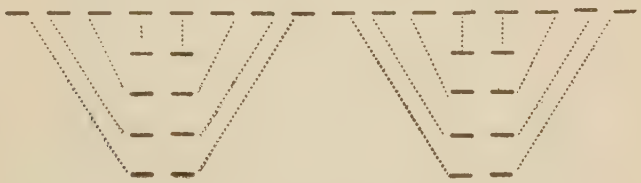
up, the regiment moves, in the main, straight to the front. In line of escadrons in columns of platoons, the escadrons, each in column of platoons, are abreast of each other at deploying interval plus six paces. In this formation, when the platoons consist of twelve files each, the regiment has a depth of 40 paces and a front of 162 paces (when the platoons consist of sixteen files each, a front of 228 paces).

When in line of escadrons in columns of platoons, the regiment can form line without difficulty, can avoid obstacles easily, and its losses are less than in line, as the small columns marching abreast compel the enemy to distribute his fire. Furthermore, this formation facilitates detaching escadrons on independent missions.

Regiments of six escadrons (Austria and Russia) possess these advantages to a limited extent only, as they cover a front of 290 paces (or, when platoons consist of sixteen files each, a front of 400 paces).

The high value placed on line of escadrons in columns of platoons had its origin in the era in which all cavalry formations were designed with a view to the employment of cavalry in successive lines. "It [line of escadrons in columns of platoons] possesses little handiness, renders materially more difficult all changes of direction, loses direction

and distances very easily, and necessitates complex movements in order to form column. These disadvantages become strikingly apparent when considerable masses of cavalry are assembled. Even in a brigade these drawbacks make themselves very sensibly felt. It is, in fact, a formation designed exclusively with a view to the employment of units in successive lines, and for this reason alone meets one-sided requirements only. There is, however, no compelling reason for retaining it as the principal maneuvering formation of cavalry and for considering it, as it were, outside the limits of discussion".* General v. Bernhardi recommends that the regiment be formed in "line of demi-regiments," each of the latter forming one unit and embracing two escadrons, each in column of platoons, abreast. This formation is already employed in Austria, where the regiment advances in line of "division columns"—so-called.



"The regimental commander would then have but two units to direct. These two units will maintain their position relative to each other more readily than four, will execute changes of direction with great ease, and will be able to form line just as quickly as will a line of escadrons in columns of platoons. Moreover, they will permit column or successive lines to be formed with greater ease than is possible from line of escadrons in columns of platoons. The formation in demi-regiments permits successive lines to be formed, in the simplest manner, to the front, and an

*V. BERNHARDI, *Unsere Kavallerie im nächsten Kriege*, p. 162 (see *Cavalry in Future Wars*, by v. BERNHARDI, GOLDMAN'S translation, p. 228).

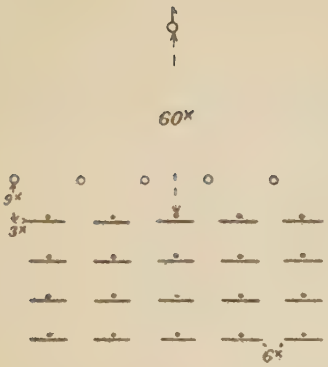
echelon formation to be taken up in any direction. In addition, this formation is very mobile, easily concealed, and combines the advantages of a route formation of little depth with those of a maneuvering formation. In the latter character, it might be employed to particularly good advantage by large units operating in close country, as it enables the regimental commander to keep the troops well in hand, while, at the same time, permitting deployment with the utmost despatch in combat formation in successive lines either to the front or to a flank. It would, without doubt, have the same advantages in the brigade when the regiments are formed side by side. It will be particularly adapted for flank movements, in which it is essential to develop, while in motion, the maximum fighting power in the direction of the movement, and in which it is desirable, after wheeling into line, to have the requisite depth as well as protection on the exposed flank."*

### 3. The Regimental Column.†

The regimental column (called "mass" in all the other regulations) is used principally as an assembly formation. It should be used as little as possible on the battlefield, as it may receive artillery fire at long ranges and is never secure from being surprised by fire. On account of its width, a regimental column is difficult to conceal and the dust raised by it at fast gaits does not settle quickly, which fact makes it more difficult to surmount obstacles. When the regiment is in this formation, the regimental commander can still con-

*v. BERNHARDI, *Unsere Kavallerie im nächsten Kriege*, p. 163 (see *Cavalry in Future Wars*, by v. BERNHARDI, GOLDMAN'S translation, pp. 228 and 229).

†*Regimentskolonne*. This formation is identical with the "mass" used in the United States Cavalry, except that the escadrons are in columns of platoons instead of fours, and that the interval between elements is 6 paces instead of 11 yards.—*Translator.*




trol it directly by commands. In regimental column, the escadrons, each in column of platoons, are abreast of each other at intervals of six paces (in France, Italy and Austria ten paces, in Russia, seven paces). As the regimental column can not be directly deployed into line, it affords the regiment a readiness for combat next inferior to line and line of escadrons in columns of platoons. When platoons consist of twelve files each, the regimental column is 40 paces deep and 66 paces wide (in Austria 122 paces wide). On account of this favorable ratio of width to depth, this column is both very compact and very mobile.* To form line quickly to the front requires special training. The deployment into line in an oblique direction as a rule causes an echeloning of the escadrons. The regimental column appears to be particularly unsuited for regiments of six escadrons. In Italy, the "mass" formation is to be employed only so long as the enemy's actions or the terrain do not compel the assumption of line of escadrons in columns of platoons. The Russians seek to remedy the disadvantages of the regimental column by breaking off the flank escadrons.

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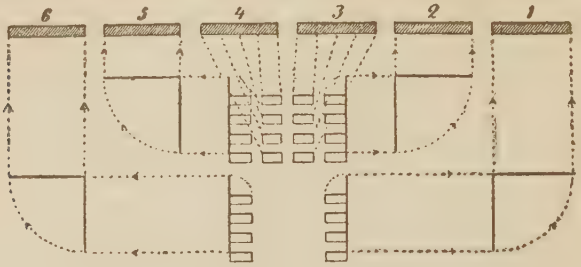
*When cavalry in regimental column enters the zone of effective hostile fire, it very quickly suffers serious losses.

Obstacles on the battlefield of Vionville compelled the 16th Cavalry Brigade to close intervals when it rode past Flavigny in line of escadrons in columns of platoons. This converted the brigade into a dense mass, which offered a favorable target to the French projectiles. The brigade was then forced to retire on account of the heavy losses suffered by it. The 3d Hussars lost on this occasion 3 officers, 80 men and more than 100 horses. KUNZ, *Reiterei*, p. 101

**Front into Line from the Russian Regimental Column, in which the Flank Escadrons are broken off.**




### 4. Column of Platoons.

The escadrons, each in column of platoons, cover and follow each other at platoon distance plus six paces. This column can be controlled by the voice of the regimental commander in exceptional cases only. Visual signals and bugle signals increase in importance. This is likewise true of following in trace, the escadrons in rear taking up, without specific orders to that effect, the cadence and formation of the next preceding escadron. When in this formation, the regiment can easily change direction, take advantage of the ground and surmount obstacles. If ditches with marshy borders have to be taken, it is advisable first to execute escadrons front into line. By wheeling into line by platoons, the column of platoons is quickly rendered ready for action to a flank, and for this and the previously mentioned reasons, it is especially adapted for executing flank movements. The weakness of the column in the direction of march requires that special measures be taken to protect its head.

Column of platoons is not a suitable formation for a frontal movement against the enemy, as it is difficult to deploy the column in that direction.

### 5. Double Column.

The necessity of protecting the head of the column of platoons, quite naturally leads to the formation of double column. In this the escadrons, each in column of platoons, are two and two abreast with an interval of six paces between them, the distance between successive escadrons being platoon distance and six paces. With an uneven number of escadrons, the left column, in which the base escadron is posted, is the stronger. The double column is the mean between column of platoons and regimental column. It possesses the great mobility of the latter without being encumbered with the depth of the former, and can deploy as readily to the front as to a flank. Moreover, it has the same advantages formerly possessed by columns that had wheeled to a flank. For this reason, the double column is especially adapted for flank movements, particularly when two "waves" are to be formed for a charge.

Although the advantages of the double column are especially apparent in six-escadron regiments, some objections are raised against it by the Austrians. For example, it is stated, "that on account of the noise, commands can be heard with difficulty only; that the deployment (in a six-escadron regiment) is, in reality, restricted to the head of the column; and that the latter invariably forms the objective of the hostile attack. The area of burst of a shrapnel covers the entire space occupied by the double column, and a single good hit by such a projectile might perhaps suffice to disperse the column. In spite of this, the double column finds more advocates and more frequent application than it deserves." *

*v. WALDSTÄTTEN, *Taktik*. I, p. 97.

### 6. Route Column.*

When the regiment is in column of twos or fours, the escadrons follow each other at 10 paces (8 m.) distance (in Russia at platoon distance). To form line from these columns is difficult and time-consuming on account of their great depth. For this reason, special protection is necessary. Large units will, as a rule, march in column of fours, the deployment being accelerated by a timely execution of platoons front into line. The units in rear of the leading element must assume—independently and without awaiting orders—the formation taken up by those in front. On the march, commanders of escadrons and of platoons ride wherever their presence in supervising their organizations is required. A trumpeter rides at the tail of the column in order to blow "clear the road," this being the signal for clearing one side of the road.

The field train marches at the tail of the regiment in order that it may not interfere with the deployment when the enemy is encountered. When the regiment marches alone, it may be advisable to let the field train march at some distance in rear.

*Depth of a regiment:*

*Germany* (4 escadrons):

In column of fours (with combat train) 530 m., in column of twos 1,010 m.

*Austria* (6 escadrons):

In column of fours.....723 m., in column of twos 1,493 m.†

Line of route columns may be used on the battlefield by a large unit, for the purpose of taking advantage of accidents of the ground, for crossing difficult terrain, and

*Par. 348, *German F. S. R.*

†For details see p. 50, *supra.*

for minimizing losses when exposed to frontal artillery fire. This formation is taken up, for example, from line of escadrons in columns of platoons, by one, several, or all of the escadrons forming route column, while maintaining their relative positions with reference to each other (open formations). Intervals and distances may be given up when crossing ground swept by the enemy's fire. Close order formations are resumed as soon as the dangerous zone has been crossed or the position from which the charge is to be made has been reached. This formation in line of route columns is, however, unsuitable when an encounter with hostile cavalry is imminent. Since it is difficult to gallop in column of fours (closed up), it would perhaps be desirable to form line of platoons or half-escadrons in columns of twos, in which the horses can gallop with greater ease.*

*France:* Line of platoons in columns of fours (*Ligne de pelotons par quatre*), i. e., the four platoons, each in route column with the distance between fours increased to 1.50 m., are abreast of each other at diminished or normal intervals.†

### (b) EVOLUTIONS OF THE REGIMENT.‡

The regiment marches to the front, to the rear, and to a flank (usually for short distances only, by wheeling into column by platoons), in the same manner as the escadron. It changes direction, when in column, by turning, by marching on a new objective, or by simply following in trace. Considerable changes of direction (i. e., those exceeding 45 degrees) require a different procedure when the regiment is in line or in line of escadrons in columns of platoons.

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*For riding in this formation, see v. EDELSHEIM, *Über kriegsmäszige Ausbildung usw.*, p. 174.

†*Revue de Cavalerie*, July 1908, *l'Anarchie.*

Line of platoons in columns of fours is called *le bloc* when the interval between platoons is 4 m., and *le carrè* when that interval is 8 m. Intervals of from 12 to 16 m. are recommended for crossing difficult terrain, and intervals of 25 m., for crossing fire swept ground.

‡Pars. 135-169, *German C. D. R.*

When the regiment is in line of escadrons in columns of platoons, for example, and a considerable change of direction is to be executed, all the escadrons first change direction, those in rear of the first then moving by the shortest route to their new positions abreast of the leading escadron. (See plate p. 68). When the regiment is in line and a considerable change of direction is to be effected, the regiment first wheels into column of platoons and then executes front into line. Under certain circumstances, it may be advisable to have the escadron on the inner flank in line change direction at once, the other escadrons then moving by the shortest route to their proper positions in the new line.*

## Deployments.

The regulations make a distinction between *development*,† *deployment*,‡ and *front into line*.¶ The term *development* denotes the transition from route column to column of platoons, double column, or regimental column. The term *deployment* denotes the transition to line of escadrons in columns of platoons. The term *front into line* denotes the transition to line. The term *transition*§ is used to designate all other changes of formation. Transitions to a broader formation are executed as a deployment, transitions to a narrower formation as a ployment. (Par. 45, German C. D. R.).

Changes of formation must likewise be capable of being executed while the march direction of the entire regiment is changed simultaneously therewith. For example, when the regiment is in double column or in regimental column, the leading element of the regiment executes a turn in the new direction; when the regiment is in any other

*In Austria changes of front are effected in a very awkward manner on fixed pivot when the regiment is in line of escadrons in columns of platoons.

†*Entfaltung.*

‡*Entwicklung.*

¶*Aufmarsch.*

§*Übergang.*

formation, the head of each escadron executes such a turn, the new formation being ordered, in either case, while the movement is in progress. The escadrons are then led by the shortest route to their proper positions. The guiding principle is, "*First determine the march direction, then the formation.*" (Par. 168, German C. D. R.).

In **Russia**, the 1st, 2d and 3d escadrons habitually place themselves to the right, the 4th, 5th and 6th habitually to the left of the leading element.

In **France**, when deployments and changes of formation are to be executed, the regimental commander, followed by the standard bearer moves in the new direction for thirty paces and then orders the new formation. The escadrons then move by the shortest route, by obliquing, by partially changing direction, or by the flank to their positions. When deploying preparatory to a charge, it is considered advisable to decrease the gait in order to obtain better cohesion.

Being in regimental column, or in double column, to form line of escadrons in columns of platoons: When the regiment is marching, the escadrons extend (in the reverse movement, they close) on the base escadron. When the regiment is halted (necessarily in a covered position, if the charging ground in front is limited), the escadrons on the right wheel to the right, those on the left to the left, by platoons, gain the necessary ground at the trot and wheel again to the front by platoons and move to their positions. The escadron on which this movement is executed moves forward a distance equal to platoon front plus six paces.

Being in column of platoons, to form line of escadrons in columns of platoons: The leading escadron rides forward sixty paces at the gait ordered and then comes down to the walk. Each of the other escadrons changes direction and moves to its proper place. (Par. 143, German C. D. R). When this movement is to be executed so that, at its conclusion, all the rear escadrons will be on one side of the leading escadron, a special order to that effect must be given.

Being in column of platoons, to form line of escadrons in columns of platoons to a flank: Each escadron changes direction.

Being in route column, to form line of escadrons in columns of platoons: The leading escadron executes platoons front into line, each of the others changes direction, forms column of platoons and moves to its proper position.

### (c) TRANSITIONS TO NARROWER FORMATIONS (PLOYMENTS).

Being in line, to form line of escadrons in columns of platoons: Each escadron forms column of platoons.

Being in line, to form double column or regimental column: The base escadron forms column of platoons, the others likewise form column of platoons and move to their proper places.

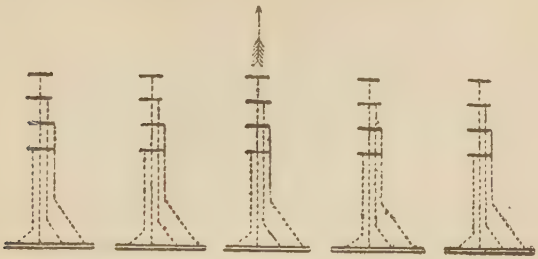
Being in line, to form column of platoons to a flank: The regiment wheels into column by platoons.

Being in line of escadrons in columns of platoons, to form column of platoons to a flank: The escadron on the flank toward which the movement is to be made wheels into line by platoons in the direction in which the column is to face and then forms column of platoons; the other escadrons conform to the movement.

Being in line of escadrons in columns of platoons (or in double column), either at a halt or while marching, to form regimental column: The escadrons close in on the base escadron.

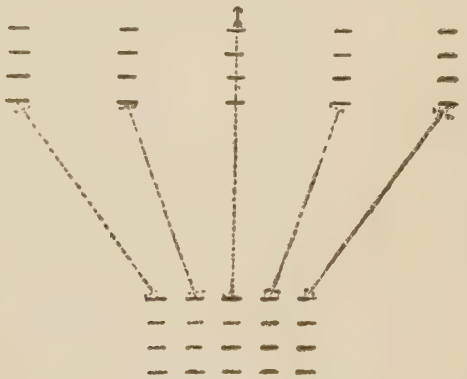
The transition from regimental column to double column and to column of platoons to the front or to a flank, is executed according to the principles already mentioned.

The Regiment Forming Line of Escadrons in Columns of Platoons from Line.

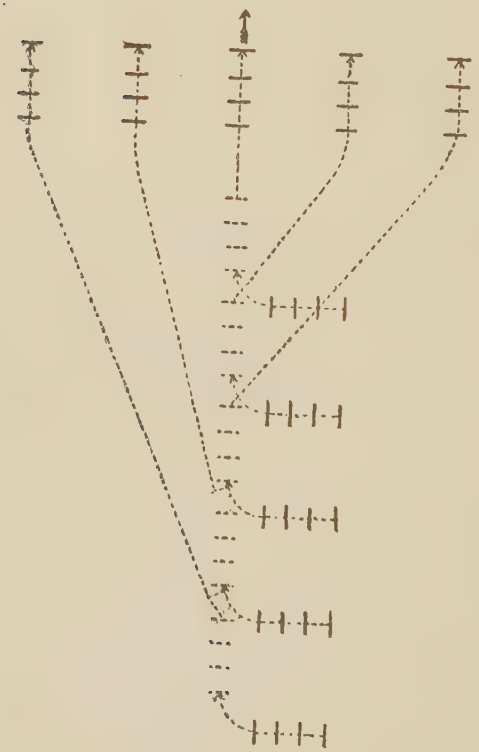


The Regiment Forming Column of Platoons from Regimental Column.

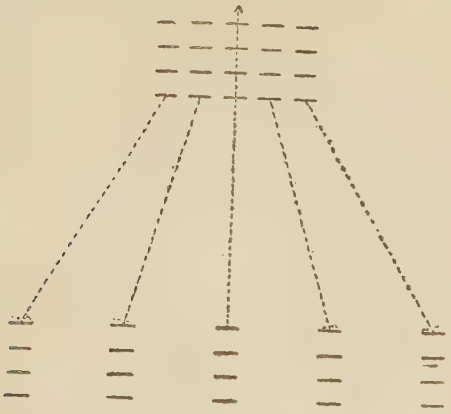
Transition from Regimental Column to Line of Escadrons in Columns of Platoons.



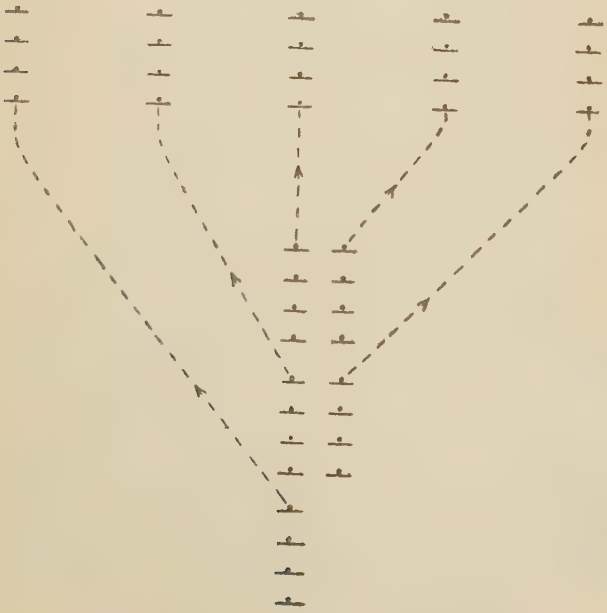
**Example of a Considerable Change of Direction Effected by the Regiment while in Line of Escadrons in Columns of Platoons.**



**The Regiment Forming Regimental Column (while in motion) from Line of Escadrons in Columns of Platoons.**

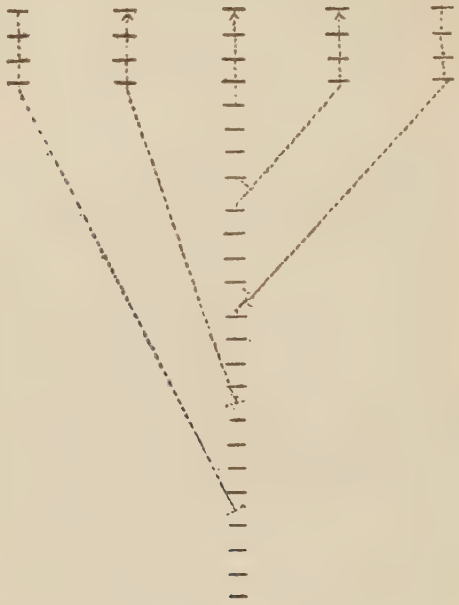


**The Regiment Forming Line of Escadrons in Columns of Platoons from Double Column.**



### (d) MOVEMENTS IN COLUMN AND IN LINE OF COLUMNS.

**Transition from Column of Platoons to Line of Escadrons in Columns of Platoons.**



### (e) TRANSITION TO LINE.

Line may be formed in the simplest and most orderly manner from line of escadrons in columns of platoons and from column of platoons, by executing front into line in the former case, and by wheeling into line in the latter. On account of the depth of the route column and of the column of platoons, the escadrons will frequently not be able to move out at once when the command front into line is given. The leading escadron forms front into line at once, each of the others changes direction and gains sufficient ground to the flank to enable it to execute front into line and to move straight to the front. In close proximity to the enemy, the

regiment, when in column of platoons, will frequently be able with advantage to change direction and to wheel into line by platoons.

Line is formed from line of escadrons in columns of platoons, by all the escadrons simultaneously executing front into line. When the regiment is halted, or when marching at the walk, this movement is executed at the trot; when marching at the trot, it is executed at the gallop; when marching at the gallop, it is executed at an accelerated gallop. As each escadron executes right and left front into line simultaneously, it may happen, when the intervals are too small, that the exterior platoons of two adjacent escadrons collide. (Par. 260, German C. D. R.). Being in line of escadrons in columns of platoons, to form line in an oblique direction: The escadrons first partially change direction, each then executes front into line, and moves to its place in the new line.

Front into line from regimental column* is not so very simple, if time and room are lacking for first forming line of escadrons in columns of platoons. It may, however, frequently become necessary to form line from regimental column.† Each escadron executes front into line separately,

*The regulations do not prescribe how front into line from regimental column is to be executed. General v. SCHMIDT, in his *Instruktionen*, p. 197, says: "It is of the utmost importance that as broad a front as possible be presented at once to the enemy, either in the direction in which the column is facing, or, after the leading element has changed direction, toward the objective." Execution: "The right and the left flank escadrons execute right front into line and left front into line, respectively, and then move out for the purpose of making a flank attack on the enemy. The escadron next in line on the right and the one next in line on the the left then promptly execute right front into line and left front into line, respectively. In this manner, all the escadrons but the one in the center (if the regiment consists of five escadrons), are deployed."

†At Wörth, the 13th Hussar Regiment, while in regimental column, wheeled about by platoons on sighting French cavalry, and charged directly from its position, as neither time nor room was available for forming line. The rear platoons moved out of the column and turned against the flank of the hostile cavalry. KUNZ, *Reiterei*, p. 50.

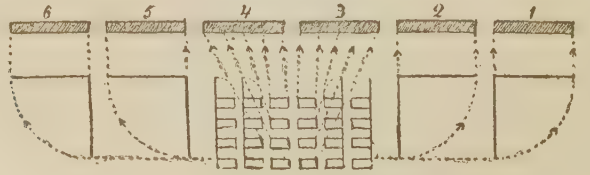
Two escadrons of the same regiment attacked French cavalry that was debouching in column from Gautier (Sedan). The leading platoons of the two escadrons mentioned, charged; the remaining six platoons moved to the rear to gain room, executed front into line and then charged in echelon formation from one flank. *Ibid.*, p. 198.

as follows: The base escadron, on which the extension is made, as soon as it has room for forming line; the other escadrons, as soon as, by changing direction, they have gained sufficient interval to the right and left front, respectively. Each one of these escadrons, as soon as it has formed line, then places itself abreast of the base escadron, whose subsequent conduct is determined by orders. This procedure is accurately adapted to that of the regulations. The certainty of its execution in a critical moment is assured because the deployment is effected in the same manner as if time had been available for first forming line of escadrons in columns of platoons and then executing front into line, except that in this procedure the several movements shade more closely into one another. If a special form of executing front into line were prescribed for this deployment, there would be danger of misunderstanding and of friction that might impair the success of the charge.

**France:** The right and left center escadrons execute right front into line and left front into line, respectively. The right and left flank escadrons gain the necessary deploying interval by changing direction, and then execute right front into line and left front into line, respectively.

**Austria:** The two center escadrons move forward a distance equal to the depth of the column and execute front into line. The remaining escadrons gain the necessary interval and each then executes right front into line or left front into line, as the case may be, depending upon whether it is to the right or to the left of the base escadron.

**Russia:** According to the Russian regulations, the flank escadrons wheel toward the outer flanks by platoons, each escadron then wheeling to the left or right, as the case may be, as soon as it has gained sufficient ground, and marching in line to its place. The right and the left center escadrons execute right front into line and left front into line, respectively. It will, at best, take considerable time to form a broad front in this manner.



### (f) TIME REQUIRED FOR DEPLOYING.

Control of time and space is of prime importance to the leader when leading troops on the terrain. Prompt and correct recognition of the point where the collision with the hostile cavalry will take place, in many cases determines the mode of deployment, i. e., whether the deployment is to be made forward or by the flank. If by the flank, the leading element is halted. While the deployment forward, which includes covering part of the distance to the enemy, frequently contains the element of surprise, it always results in increasing the morale. One will choose this mode of deployment, if one may hope to encounter the enemy while he is still in the act of forming line. To halt the leading element and to deploy by the flank saves time, room and energy. The deployment by the flank will be used when unfavorable terrain is located in the immediate front; when one can compel the enemy to charge uphill, over very soft ground, or on difficult terrain; and when one desires to give one's artillery time to produce some effect. In respect to the feasibility of making evolutions in the presence of hostile cavalry, General v. Schmidt lays down the rule that the leader of the first line must be finished with all deployment by the time he has approached to within 500 paces of the enemy; that wheels to a flank by platoons can still be made at 600 paces; and that more extensive flank movements are possible at 1,000 paces.

A cavalry regiment, provided platoons consist of twelve files each, requires 80 seconds at the trot and 40 seconds at the gallop to form column of platoons from column of fours. When the units have to execute front into line successively, these figures are increased to 240 and 120 seconds, respectively. It takes 70 seconds at the trot and 50 seconds at the gallop to form line of escadrons in columns of platoons from column of platoons. To form line from line of escadrons in columns of platoons [each escadron executing front into line],

requires an additional 20 seconds, when executed at the trot, or 12–15 seconds, when executed at the gallop. It is thus evident that a cavalry regiment, in order to pass from route column to line toward the front, requires at the trot 170, at the gallop 105 seconds. When the escadrons successively form column of platoons (for example, on debouching from a defile), these figures are increased to 268 and 139 seconds, respectively. When signals are not used, the time consumed is still further increased by the escadron commanders' repeating commands. In 105 seconds, the hostile cavalry can cover 720 m., in 268 seconds, 1,750 m.

A knowledge of the time required for deploying will enable the leader to determine whether he has time enough to form line of escadrons in columns of platoons from column of platoons (i. e., whether he can deploy forward), or whether, in order to form line more quickly, he should have his leading element change direction and then have the whole force wheel into line by platoons. When platoons consist of sixteen files each, the regiment can form line of escadrons in columns of platoons from column of platoons in 70 seconds, the entire movement into line consuming 92 seconds (leading element at the trot). If we assume that, in addition, a space of 200 m. is required for fully developing speed for the charge, this mode of deployment should be used only if the two opposing forces are still at least 1,000 m. apart. For the leading element to change direction and for the platoons to wheel into line at the gallop requires about 60 seconds. This mode of deployment proceeds with considerably greater rapidity than the one first mentioned, and can still be employed when the enemy is from 600 to 1,000 m. away. A regiment that, while in column of platoons, encounters the enemy within 500 m., will not be able to count upon deploying all of its escadrons, but will be compelled to let them charge individually.

The time required for deploying may be computed as follows: If the leading element continues the march at the trot (300 paces per minute),

it will be overtaken by the last subdivision in x minutes, when the latter has covered 500 paces in x minutes. If we let l represent the depth of the column, we obtain the equation:

$$x \times 300 + l = x \times 500$$
$$l = x(500 - 300)$$
$$x = \frac{1}{500 - 300}$$

In other words, the time, in minutes, required for deploying is equal to the depth of the column divided by the difference between the gait of the leading element and that of the rear subdivision. The result, to be sure, is but a rough approximation, which can have a conditional value only.

## 3. THE BRIGADE.*

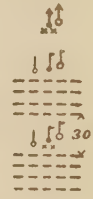
The exercises of the brigade serve the purpose of training from two to three regiments for employment in one body as an independent tactical unit, and as an integral part of a cavalry division. The drill is concluded in the division. The importance of the brigade as a tactical unit has been enhanced by the employment of cavalry by wings (i. e., the tactical units abreast). The brigade will almost invariably be given an independent combat mission. The brigade commander, who will usually have ridden far in advance, will be able to communicate his intentions to his brigade only by means of bugle and visual signals and by means of orders transmitted through orderly officers.

When the brigade is in line, the regiments, each in line, are posted abreast of each other with an interval of fifteen paces between them. When the brigade is in column, the regiments are either abreast or in rear of each other. The following are the formations of the brigade:

*Pars. 180-202, *German C. D. R.*

The brigade in line;—in line of escadrons in

columns of platoons;—in brigade column (the regiments, each in regimental column, abreast with an interval of 15 paces between them);*—in regimental columns (the regiments, each in regimental column, in rear of one another at a distance of 30 paces);†—in double column (the regiments, each in double column, in rear of one another). The employment of the double column, the regiments in rear of one another, appears to be particularly profitable when, in charging infantry, two successive lines are to be formed toward a flank. The brigade may likewise be formed in double (or treble) column of platoons [the regiments, each in column of platoons, abreast of one another]. The brigade column, the brigade in regimental columns, the double column, or the double column of platoons should be used for assembly. These formations do not permit deployment with sufficient ease to make them suitable for movements under hostile fire and when an encounter with hostile cavalry is imminent. The double column may frequently be employed preparatory to a charge against infantry. In other cases, the leader will apply par. 192, German C.

**Brigade in Regimental Columns.**

**Brigade in Double Column of Platoons.**

*General v. BERNHARDI, says: "..... This is the popular and favored maneuver formation of all cavalrymen of the old school. It should, of course, not be allowed to appear on the battlefield at all. It might profitably be replaced by the line of regiments in double columns at deploying intervals."

†When regiments consist of four escadrons each, it is possible to wheel into line toward a flank—this, to be sure, only at the expense of the interval between the regiments.

D. R., which states: "Moreover, the brigade commander is not debarred from grouping the regiments (each in some formation prescribed for it), in such a manner at any time, as, in his opinion, the situation and his intentions require." This means that the brigade is to be led forward according to the terrain and the purpose of the action. For example, the regiments may be formed in regimental columns or in double columns with deploying interval between them, either on the same line or in echelon, abreast of each other. The regiment on the left flank of the brigade is designated as the base regiment, or some unit is directed to maintain contact. All the others conform to it in their movements and measures.

The brigade may, in addition, be formed in column of platoons (with platoon distance plus 15 paces between regiments), and in route column (with twenty paces distance between regiments).

**Deployments.** (Par. 195, German C. D. R.).

When the regiments are abreast of one another without deploying interval, they deploy right front into line and left front into line respectively. When they are abreast with deploying interval between them, each regiment deploys as if alone, i. e., each regiment deploys by executing, simultaneously, right and left front into line.

When the regiments are in rear of one another—the brigade in regimental columns, or in double column—the leading regiment deploys left front into line, the rear regiment right front into line.

**Transitions.** (Par. 196, German C. D. R.).

**"A. Transitions within the regiments, without change in their relative positions:**

"(*a*) *When the regiments are in rear of one another and retain their relative positions:*

| | | |
|---|---|---|
| "Ployment: Transition to narrower front: | 1. From brigade in regimental columns to double column; | The rear regiment halts until disengaged. |
| | 2. From brigade in regimental columns to column of platoons; | |
| | 3. From double column to column of platoons; | |
| "Deployment: Transition to broader front: | 4. From column of platoons to double column; | All these transitions are executed as prescribed for a regiment acting alone. |
| | 5. From column of platoons to brigade in regimental columns; | |
| | 6. From double column to brigade in regimental columns; | |

"(*b*) *When the regiments are abreast of one another and retain their relative positions:*

| | | |
|---|---|---|
| "Ployment: Transition to narrower front: | 1. From line to brigade column; | The base regiment forms on its base escadron. The regiment on the right, in order to reduce the distance to be traversed by it, may form on its inner flank-escadron, at the command of its regimental commander, and then, if necessary, move abreast of the base regiment.* |
| | 2. From line to double column of platoons; | |
| | 3. From line of escadrons in columns of platoons to brigade column; | |
| | 4. From line of escadrons in columns of platoons to double column of platoons; | |
| | 5. From brigade column to double column of platoons; | |

*"The new formation would, in the above cases, be taken up more expeditiously, if the base regiment would likewise form on its inner flank-escadron. This, however, would mean the abrogation of the principle laid down for the base regiment. No sound reason existed for doing this, in view of the advantages of uniform principles and the insignificant increase in the distance traversed by the base regiment when moving as laid down above." v. UNGER.

| | | |
|---|---|---|
| "Deployment: Transition to broader front: | 6. From double column of platoons to brigade column; | The right regiment forms to the right front, the left regiment to the left front. |

"(*c*) *When the regiments are abreast of one another at deploying interval* and retain their relative positions:*

"Each regiment executes the transition within itself, as prescribed for a regiment acting alone.

**"B. Transitions that change the relative positions of the regiments, one to the other.**

"(*a*) *When the regiments are in rear of one another and move so as to come abreast of one another:*

| | | |
|---|---|---|
| "Deployment: Transition to broader front: | 1. From brigade in regimental columns to brigade column; | The rear regiment moves to the right front and forms on the right of the leading regiment; |
| | 2. From double column to brigade column; | The leading regiment forms to the left front, on its leading escadron; the rear regiment moves to the right front and forms to the right front on its leading escadron. |
| | 3. From column of platoons to brigade column; | |

*Par. 192, *German C. D. R.*

"(*b*) *When the regiments are abreast of one another and move so as to come in rear of one another:*

| | | |
|---|---|---|
| "Ployment: Transition to narrower front: | 1. From brigade column to brigade in regimental columns; | The base regiment moves out (and ploys) first, the rear regiment conforming to the movement as soon as disengaged. Until disengaged, the rear regiment halts, as otherwise the transition would consume too much time. |
| | 2. From brigade column to double column; | |
| | 3. From brigade column to column of platoons; | |

"Route columns have not been considered. Neither is a discussion given of the transition from line to line of escadrons in columns of platoons, nor from the latter formation to line of double columns at deploying interval, as no change takes place."*

Foreign cavalry drill regulations prescribe, in the main, the same formations. It does not seem necessary to prescribe specially the formation in which the regiments are abreast with deploying interval between them, as is done for example, in France and Italy. The German deployment into line of escadrons in columns of platoons from brigade column, on the center (i. e., on the first escadron of of the left regiment), proceeds more rapidly than if the regiments, each being in regimental column, were first to extend to deploying intervals and then to form line of escadrons in columns of platoons.

It takes about four minutes to form column of platoons from column of fours and eight minutes to execute the same movement from column of twos,when the platoons simul-

**Supplements* Nos. 4 and 5 to *Militär-Wochenblatt*, 1909, p. 179.

taneously execute front into line (their leading elements coming down to the walk). For the brigade to pass at the gallop from column of platoons (each platoon consisting of sixteen files) to line consumes at least four or five minutes when signals are used. The time consumed is considerably increased, due to the repetition of commands, when the movement is executed by command.

General v. Verdy computes that a brigade with a horse battery requires 7 minutes at the trot and 4 minutes at the gallop to deploy from column of threes into two lines; that a second brigade (with a horse battery) following the first in like formation, requires 14 minutes at the trot and 8½ minutes at the gallop for this purpose. *

## 4. THE CAVALRY DIVISION AND THE CAVALRY CORPS.†

The division consists, as a rule, of three cavalry brigades, one battalion of horse artillery with light ammunition column, one machine gun battery and one pioneer detachment.

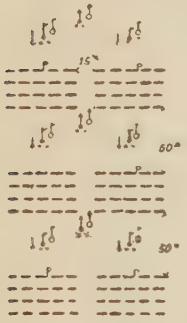
It may become necessary, during the operations as well as on the battlefield, to combine several divisions into a cavalry corps. The depth of an army corps in route column requires that, in approaching the battlefield, each division, at least, be assigned a separate road.

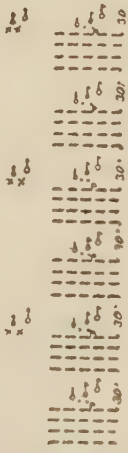
No fixed formations are perscribed for a cavalry division. The division commander, by making proper disposition of the tactical units, forms his division in each case according to the end in view.

*Studien über Truppenführung. Die Kavalleriedivision*, I, p. 100.

†Pars. 203-221, *German C. D. R.*

### Assembly Formations.

Division in Brigade Columns.

Division in Regimental Columns.



The choice of an assembly formation is governed by the extent of the available room. When the available space is very deep, and especially when the division is about to begin a march in close formation, it will frequently be a good plan to use the treble column of platoons (the brigades, each in column of platoons, abreast of each other at intervals of 15 paces). When the division is in regimental columns, the regiments are in rear of one another at a distance of 30 paces. The space required by the division in this formation, when the horse batteries and the pioneer detachment are not present, is about 65 m. wide and 400 m. deep. When the division is in brigade columns, the brigade columns are in rear of one another at a distane of 50 paces. When in this formation, the division requires a space 140 × 200 m.

On the battlefield, the formation of the division depends upon the situation and the terrain. The formation in groups enhances readiness for combat and, under certain circumstances, reduces losses. So long as the subdivisions of the division march in rear of one another, the rear subdivisions conform to the formation and gait of the leading subdivisions without specific orders to that effect. The greater the depth of the division, the greater the importance of keeping it in uninterrupted motion by maintaining a uniform cadence and by other requisite measures, and of preventing elongation of the column. The leading

unit follows the division commander until a march direction is assigned to it. An officer of the leading brigade (after the development, an officer of the base brigade) must be permanently charged to keep the division staff in view.

The deployment of the division will generally be preceded by a development, i. e. the passage from column to a formation of broader front. When the division commander desires to develop the division from route column or some assembly formation he designates in a development order, the brigade on which the development is to be made, as the base brigade and indicates its march direction. In this case, the brigades may be posted either abreast, on the same line or in echelon. Interval and distances are regulated by orders. Artillery and machine guns should be posted where their subsequent employment is most probable. When a change of direction is to be effected, the division commander indicates to the base brigade the new march direction, to which the others must conform by the shortest route. When haste is not necessary the base brigade may decrease the cadence. The relative positions of the brigades to each other remain unchanged unless otherwise ordered. When more extended changes of front, for example to the right or left become necessary, another formation is usually taken up.

The brigade commanders independently choose the formations in which their brigades are to move, being governed, in so doing, by the following considerations:

Utilization of accidents of the ground as cover;

Employment of formations that minimize the effect of the hostile fire; and

Degree of readiness for combat according to the distance to the enemy.

In the deployment, the brigade commanders independently make the necessary dispositions for distribution in depth and for flank protection.

## 5. COMPARISON BETWEEN LINE AND COLUMN.

The line is the only combat formation in which cavalry can charge in close order. In case of necessity only, when cavalry is surprised and can not form line in time, is a charge in column conceivable. The success of a charge depends upon the force of the shock (cohesion and speed) and upon the use of the *arme blanche*. The speed that is in the horses can be brought out in line only. Line only, permits all available sabers and lances to be employed.

On November 30th, 1808, the escadron of Polish Lancers detailed as Emperor Napoleon's body guard, and the remainder of that regiment charged in column of fours up the pass of **Somma Sierra** under cover of the morning fog and powder smoke, rode down the Spanish infantry and captured 4 batteries, posted in tiers, with 15 guns. The Lancers lost 6 officers and 80 men out of an effective strength of 7 officers and 150 men.*

At **Dembe Wielki,** March 31st, 1831, when the Russians had already made dispositions for the retreat, 12 Polish escadrons charged in column of sixes along the *chaussee* embankment under cover of darkness. They captured 4 guns, dispersed Russian infantry and repulsed a counter-attack made by Russian cavalry.

The charge at **Meslay** (engagement at **Monnai,** December 20th, 1870): See Chapter V, *infra.*

Cavalry should never allow itself to be charged while standing still, for it would be crushed by the force of the shock. A charge in column is but a makeshift, since an equally strong and efficient cavalry force in line would be superior to the former on account of its formation alone.

During the battle of **Balaklava,** October 25th, 1854, a Russian cavalry mass under General Ryow and consisting of 2,600 men formed in a single column, was thrown back by six weak English escadrons under General Scarlett. The English escadrons charged the front and flanks of the Russian column, the latter receiving the charge while halted.†

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**Kavalleristische Monatshefte,* December number 1908.

†KINGLAKE, *Invasion of the Crimea,* VII, p. 180.

The principle enunciated is directly responsible for the demand made on the cavalry for great mobility. But mobility is possessed neither by the line nor by the line of columns. This is due to the fact that changes of direction in these formations are awkward movements and that passable ground along the entire front is to be found only here and there for distances of any length. For this reason, the cavalry needs the column as a maneuvering formation. The column has the advantage of greater mobility in all directions than the line. It can change front and march direction more easily and can take advantage of accidents of the ground better than can the line. Moreover, it permits line to be formed quickly either to the front or to a flank. The column, in addition to possessing great mobility, must permit line to be formed in the quickest and simplest manner. This is the standard that determines the usefulness of the various columns on the batttlefield.

The deficient maneuvering capacity of the French cavalry at the beginning of this century, compelled the French to hold it together in dense masses, and was responsible for the introduction of the charge in column. "The principal foes of the column are disorder and unwieldiness, which are caused by the leaders' losing almost all influence over their units as soon as the column is moving at a fast gait. This disorder is augmented by dust and by natural obstacles. No one sees where he is going; an evasion of obstacles is not to be thought of; bullets drop into the column; here and there a horse and trooper break down, the others must press on over their bodies; the voice of the leaders and even the blast of the trumpet is lost in the thunder of hoof-beats, the rattle of arms, the roar of hostile guns; the column becomes a mob, which, at best, if crowded together, rushes along like a mass of wild horses. It may ride down, it is true, whatever is opposed to it, but nothing more, and no one can tell what will subsequently become of it. If, therefore, the enemy avoids the direct onslaught and falls upon the flank and rear of this unwieldy mob, from which all order and leadership have parted, the combat is bound to end with the defeat of the column." *

*v. GRIESHEIM, *Taktik*, p. 309

The line has another pronounced advantage over a column of equal strength—that of greater front, which enables the overlapping portions to envelop the enemy and to attack him at his weakest point, his flank. The line, however, has the disadvantage that its flanks are weak and require special protection (defensive wings, so-called, i. e., echelons posted on or in rear of the flanks) and that the danger of being pierced increases with its length (making supporting escadrons necessary). Cavalry that is charged in flank is just as sure to be defeated as cavalry that awaits the enemy's charge. In either case the counter-attack is wanting. As the flanks of infantry and artillery are likewise better objectives for a charge than the firing fronts, the efforts of the cavalry should always be directed toward gaining the exposed flank of the enemy. In doing this, however, the cavalry must take care that its own flanks are not exposed to hostile attack.

# III. THE COMBAT OPERATIONS OF CAVALRY.

## I. THE EMPLOYMENT OF CAVALRY IN BATTLE.

It is only when superficially viewed that the experiences of the British in South Africa and of the Russians and the Japanese in Manchuria argue against a battle use of cavalry. It is the latter's right and duty to lay claim to a full share in the decision. Every victory that the cavalry did not improve, every defeat that it did not, with reckless self-sacrifice, do its utmost to avert, is a reproach to the arm. It is immaterial whether cavalry fights mounted or dismounted, so long as something decisive is done. When mounted, cavalry can take trenches neither from the front nor from the rear, but, when dismounted, a considerable force of cavalry can break down, with its fire, the power of resistance of the enemy. Cavalry may, perhaps, have occasion to use the carbine fifty times before it can use the lance once, but this one instance may decide the battle, this one charge may save months of further bloodshed. It has been asserted—and not unjustly—that the failure of the Japanese cavalry at the close of the battle of Mukden deprived Japan of her war indemnity.

In the **Boer war,** the English cavalry had to suffer the consequences of poor training and of errors in army administration. Trained solely for the mounted charge, the cavalry had had no practice in covering long distances at a fast gait and with full kit. Little importance had been attached to dismounted action, because, in earlier campaigns, this had always fallen to the lot of dismounted infantry. It was not until December of 1899 that the regiments that had been embarked too late, reached South Africa much worn out by a sea trip lasting twenty to thirty days. On their arrival, the hottest summer weather prevailed, but no time could be given the horses to recuperate. The unfavorable reports arriving from all parts of the theatre of war called the regiments to the front at once. In these circumstances, the load of 145 kg. carried

by each horse proved excessive. The first impressions received by these troops on their arrival on the theater of operations were not particularly favorable to a battle use of cavalry. The terrain, in many cases covered with boulders, the steep kopjes, and the thin skirmish lines of the enemy made charging difficult. All the reports that reached the troops on their way to the front emphasized the difficulties of any attack, and mentioned the unprecedented effect of fire, even at long ranges. If the English cavalry did not want to charge the Boer skirmishers, would it not have been possible to seek out and disperse the Boer led horses?

But the fact that favorable situations were not seized or could not be turned to good account owing to the scarcity of good horses, does not justify the conclusion that the day of a battle use of cavalry is past.

A cavalry division* that was hurriedly formed under the command of General Sir John French had to contend continually with all the drawbacks of improvisation. At **Klipdrift,** on February 15th, 1900, this division succeeded, however, in riding down, with slight loss to itself, the Boer skirmish line (about 900 men on a front of 3 km.), whose fire had, up to that time, caused all the British attacks to fail. After the relief of Kimberley on the evening of February 15th, British cavalry overtook Cronje's retreating forces at **Koedoesrand** on February 17th, after a march of 56 km. and held them in check by dismounted action until the arrival of British infantry.

The cavalry, scarcely recuperated from its sea voyage, was much exhausted by this expedition. The early start, as well as the scarcity of water, contributed not a little to this exhaustion. In the 9th Lancer Regiment, which was well mounted on February 9th, only twenty-eight horses were able to trot during an inspection held on the 17th. A horse battery lost thirty-two horses from exhaustion alone. The most unfavorable single factor was, however, that the ration of oats, on which the English horses primarily depended, had to be reduced. To make matters worse, after De Wet had captured a supply column on the 15th, the grain ration had to be reduced to 1.8 kg. at the very time when the cavalry had to make the greatest exertions. No hay was available at all, and the horses had to depend on grazing. This was attended with difficulties on account of the concentration of masses of cavalry. Besides, the sparse grass contained very little nourishment. The cavalry deteriorated more and more, and available horses were transferred to the newly organized detachments of mounted infantry. On February 27th, after fifteen day's service, only 3,533 horses out of 5,027 were available. In other words, 29 percent. of the horses had succumbed to hardships and the remainder was so worn out and exhausted that, on March 6th, the cavalry had to look on inactive while the Boers fled in complete disorder past their front at a distance of 5 km. All mounted charges, all extended expeditions were form now on out of the question. Unless it was satisfied to remain inactive, the cavalry had to take to dismounted action in all cases, and it

*See the author's lecture entitled, *Die Lehren des Burenkrieges für die Gefechtstätigkeit der drei Waffen.* Berlin, 1904.

had thus degenerated into mounted infantry. The operations in South Africa confirm the old principle that in war nothing is more difficult than to improvise cavalry. Even by mounting well trained troopers on untrained animals, one does not, by a long shot, obtain cavalry.

In the Boer war, mounted infantry steps into the foreground, in place of cavalry designed for battle use. The absence of real cavalry was never felt, as the Boers themselves were but mounted infantry. To be sure, the Boers themselves, emboldened by the poor horseflesh of the British, finally made mounted charges. Thus, the experiences gained during this war can have but a limited weight.

Lord Roberts says in a memorial: "Since Waterloo, for example in the Sikh and Punjab campaigns, during the Indian Mutiny, in the War of Secession, and in the wars of 1866 and 1870-71, charges against cavalry have always taken place. Although it can not be asserted that they were ever decisive, or that they produced 'demoralizing' losses, they were, nevertheless, successful enough to demonstrate that, of two cavalry forces that charged each other with the *arme blanche*, the stronger, if well led, soon gained the upper hand. Not only ordinary common sense but history as well shows that the weaker cavalry force will have recourse to fire action as soon as it perceives the hostile superiority." In his introduction to the English Drill Regulations of 1904, Lord Roberts emphasized the fact that with the introduction of a long range magazine rifle of great accuracy, there would occur a change in cavalry tactics approximately corresponding to that which took place in infantry tactics with the change from crossbow and pike to rifle and bayonet. While the saber or the lance was in the past the principal weapon of the cavalry, the saber has now become an auxiliary to the rifle. * * * "*The improvement in firearms will turn victory to the side that dismounts first.* * * * If the modern rifle has curtailed the opportunities for a successful mounted charge, the cavalry, by its mobility and by its being armed with a long range rifle, has gained an independence never before possessed by it. The conditions for a successful or

unsuccessful termination of a campaign rest in the hands of the cavalry."

With the new regulations of 1907, the English cavalry has recovered its senses. It is divided into independent or strategical cavalry, divisional cavalry (for security and messenger service) and protective cavalry. The latter is to perform the duties of security and screening. It consists of one (mounted) brigade of Territorial cavalry, one cavalry regiment, one horse battery with an ammunition column, two battalions of mounted infantry, transport and supply columns, and one cavalry field hospital. "The essence of cavalry spirit consists of maintaining the correct mean in employing dismounted and mounted action. The occasional training of a cavalry unit in the former, need, by no means, deprive it of confidence in the latter. * * * In peace training, it is important to lay stress on training cavalry in using offensive tactics even when it fights dismounted. * * * It is certain that the rifle, no matter how effective it may be, can not replace the effect produced by the onrushing horse, the force of the shock, nor the terror inspired by the *arme blanche*. During a charge, these factors produce such enthusiasm and superiority of morale, as to make cavalry indispensable. This fact explains the success of many seemingly 'impossible' cavalry charges of the past."

The **Russo-Japanese war** likewise presented no opportunities for gathering special lessons on the battle use of cavalry.

The plains of the theater of war, on account of their manner of cultivation, and the mountains, from the very nature of things, were unfavorable for cavalry operations. The Japanese cavalry was numerically too inferior to be able to seek the decision in a mounted charge. But, as the Russian cavalry did nothing to increase the difficulties of its opponent's reconnaissance, and as this reconnaissance was, in most cases, attended to by spies, the Japanese cavalry, with few exceptions, remained under cover of its infantry.

Poor care for the horses, poor riding, mediocre and overloaded mounts,* prevented energetic mounted employment of the cavalry.

## The Operations of the Cavalry Brigade Under Prince Kanin, October 12th, 1904.†

On October 12th, 1904, (**Shaho**), the Russian Eastern Detachment (Ist, IId, and IIId Siberian Army Corps, and Rennenkampf's detachment, the latter consisting of 13 battalions, 16 sotnias, and 3¼ batteries) had furiously attacked the Japanese right flank. The advance of Rennenkampf's Cossacks, south of the Taitzu River made the Japanese general headquarters feel apprehension for the rearward communications of the army. For this reason, the 2d Cavalry Brigade (consisting of 8 escadrons and 6 machine guns, under Prince Kanin) was on the same day (the 12th) drawn to the right flank and a battalion from the line of communications brought up to reinforce it. Support was not to be expected from the hard pressed 12th Infantry Division, which received, in addition, a very effective flanking fire from Rennenkampf's horse artillery. Prince Kanin's brigade took up a position to the right rear of the right flank of the 12th Division. Here it was a little later reinforced by the battalion above-mentioned. The machine guns succeeded in so completely surprising two Russian battalions, which were eating their noon-day meal without having taken any measure for protection, that they dispersed with heavy loss. On the same day, the reserves of the Transbaikal and the Siberian Cossack Divisions were successfully surprised by fire at Pensihu. Both sides received reinforcements, Prince Kanin, a mountain battery, Rennenkampf, several battalions. Nothing was more obvious than that Rennenkampf should now go for the Japanese cavalry. The contrary happened. Rennenkampf considered that a fight at this point offered no advantages, and, in the evening, without awaiting further orders, he decided to retreat. This was actually begun without being observed by the Japanese. Prince Kanin moved to the rear for about 6 km., went into camp and threw out an outpost consisting of two escadrons. The latter apparently avoided making any reconnaissance around the flanks of the enemy. On the 13th, Prince Kanin cautiously followed directly in rear of Rennenkampf's rear guard (3 battalions and 2—3 escadrons) as far as Weiningying.

Prince Kanin certainly accomplished much on October 12th with small resources, but there his spirit of enterprise ended. The terrain was, without doubt, difficult, but the Japanese horses were used to mountain

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**British Reports*, II, pp. 527, 534 and 547.

†*Ibid.*, I, pp. 567 and 664.

country. In view of this, a movement against the rear of the enemy would, unquestionably, have been in order.*

The Russian cavalry, however, was no better. There were only 18 escadrons of Dragoons with the army, and of the 207 sotnias of Cossacks with it, only 59 were of the first levy. The numerous officers transferred from the Guards and from the cavalry of the Line to the Cossacks were unable to become accustomed to the peculiarities of the latter. The Russian cavalry can not be relieved of the charge that it was deficient in enterprise, *esprit* of the offensive, and mobility. Colonel Baykov pronounced a similar judgment on the Russian cavalry in the campaign of 1877-78. He said: "When it encountered infantry, the cavalry either retired or had recourse to dismounted action. Cavalry of the vanguard dismounted in order to defend itself against a charge made by 300 Turkish troopers, and then participated in the fire fight in which the infantry was engaged. This cavalry had lost all cavalry spirit and had degenerated into poor mounted infantry. And what was the reason for this? It had been taught every conceivable thing except one—*to go for the enemy.*" Kuropatkin practically accused the cavalry of being afraid to suffer losses. He gave the following as the reason for the small usefulness of the cavalry in front of Plevna: "Fear of the commanders to cope with problems that, although well within their powers, might have led to an encounter with Turkish infantry and to losses." Kuropatkin demands "training in self-sacrifice in time of peace." In the first instructions issued by him in 1904, he used the

*Unfortunately no details are available in regard to the operations of the 2d Cavalry Brigade, reinforced by two battalions of infantry (one battalion of the 7th Division and one of the Reserve Brigade of the IIId Army) on March 3d, 1905 (left flank at Mukden). It succeeded in stopping strong cavalry forces (the Ural and Transbaikal Cossack Divisions, according to English sources, 25 escadrons) at Tafangshen, and forcing them to withdraw. (*Schlacht von Mukden Supplement No. 10 to Militär-Wochenblatt*, 1905; *British Reports*, II, p. 222; v. TETTAU, *Achtzehn Monate mit Russlands Heeren in der Mandschurei*, II, pp. 288 and 302).

See also U. S. Gen. St., *Epitome of the Russo-Japanese War*, p. 119.—*Translator.*

harsh words: "If the morale of the Cossacks had been better, they would have charged the enemy with cold steel." The Russian cavalry masses were on hand on the battlefield, it is true, but their leaders waited for orders to act.

On August 31st, 1904, when the infantry of the IId and IVth Armies had been defeated south of Liaoyang, Samsonov's and Grekov's cavalry divisions, as well as Mishchenko's brigade, were on the right flank, but no one assumed the responsibility of engaging. The same thing happened on September 2d, when Mishchenko's cavalry division was directed to await orders. When these did not arrive, he did nothing, although it was known that the enemy was in inferior strength.

The cavalry suffered from a frittering away of its strength. Its difficulties were increased by the passive resistance of the inhabitants, by ignorance of the native language, and by the absence of good maps.

Mounted charges were seldom attempted. When made against infantry or artillery, they partook of the nature of skirmishes. The opponents accuse each other of having fired from the saddle, while halted, when warding off hostile cavalry.* Engagement at **Lichiatun** (south of Wafangkou), May 30th, 1904: Three escadrons of Akiyama's brigade charged three sotnias of Cossacks. The Japanese were repulsed, came under the fire of dismounted Dragoons, and lost 4 officers and 58 men, as against 2 officers and 35 men lost by the Russians. The lance is said to have been especially useful.†

At **Lidiatun** (Shaho), on October 30th, 1904, the 3d Sotnia of the 19th Cossack Regiment, which had been designated to cover the left flank, charged in lava formation (see p. 188, *infra*) against a Japanese battery that was in the act of moving out of position. The charge failed after the Russians had lost their leader, who had collided with a wire fence. They lost 1 officer, 47 men, and 70 horses.

On January 25th, 1905, a sotnia of Terek-Kuban Cossacks surprised and charged Japanese infantry. The Japanese lost 40 killed and 25 prisoners; the Russians only 6 men.‡ For the charge at **Langtungkou,** see p. 94, *infra.*

Situations interesting from a cavalry point of view occurred in June 1904, when Akiyama's brigade (8 escadrons, 2 battalions and 2 machine guns) took charge of protecting the siege operations of Port Arthur. The Russians, in order to screen their defensive measures, had pushed forward General Samsonov to Wafangkou with 13 escadrons, one-half company of Frontier Guards, and 1 battery. The measures

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**British Reports*, I, p. 516, and III, p. 221.

†*Taktische Detaildarstellungen aus dem Russisch-Japanischen Kriege*, Part 2 (Vienna, 1909).—*Kriegsgeschichtliche Einzelschriften über den Russisch-Japanischen Krieg*, I, p. 308 (Vienna, 1906).

‡*Kavalleristische Monatshefte*, Nos. 8 and 9 of 1907.
NIESZEL, *Enseignements tactiques*, pp. 84-95.

taken by these two opposing forces resulted on May 30th, 1904, in the engagement at **Lichiatun** (south of Wafangkou).

In their effort to screen their dispositions, the Russians reinforced Samsonov more and more during the early part of June. Finally, by June 10th, 1904, 6 battalions, 16 escadrons and 2 batteries of Stackelberg's corps (which consisted of 35½ battalions, 19 escadrons, and 11 batteries), had been used up as an outpost. This consisted of a chain of posts 30 km. long, pushed toward the south, the reserve being posted at Wafangtien. Although all lines of approach were guarded, the Japanese succeeded, by means of local superiority of numbers, in breaking through this screen and in obtaining information. In these reconnaissance fights, which frequently partook of the nature of surprises, the carbine naturally played an important rôle.

The advance of Oku's Army on June 13th, resulted in the engagement of **Wafangkou** (or **Telissu**) on June 15th. Two Japanese divisions were launched frontally against the Russian position at Wafangkou. This Russian position was from seven to eight kilometers long and faced in a general way toward the south. One Japanese division had been pushed far to the west, and Akiyama's cavalry brigade far toward the east. Thus, the situation on the Japanese side was as follows on the evening of the 14th: Two divisions were opposite the enemy's line and already very close to it; one strong group was on either flank and at that time still some eight miles from the battlefield and ready to attack the enemy's flank. On June 15th, when the right wing of the 3d Division was endangered by the advance of parts of Glasko's brigade (8 battalions and 2 batteries), Akiyama's brigade appeared on the battlefield and, by means of dismounted action, brought the Russian enveloping movement to a standstill in time. The Russian cavalry division stood in the immediate vicinity of the Russian right wing. It neglected to inform the Russian general headquarters of the approach of the 4th Japanese Division.* Moreover, it failed to delay the latter, and withdrew without offering serious resistance.†

Although the Japanese cavalry sought protection with its infantry, which fought principally behind intrenchments, it would, nevertheless, have had frequent opportunities for taking hand in the fight. If the fighting branches did not offer objectives for a mounted charge, the hostile ammunition columns would have been so much the more favorable objectives. In general, however, the cavalry should not chase after such cheap laurels, so long

*The Russians excuse this neglect by saying that the line of advance of the 4th Japanese Division lay outside of the reconnaissance area of the Russian cavalry.

†*Kavalleristische Monatshefte*, March number of 1907, pp. 195 and 211.

as there is a possibility for it to assist in bringing about the decision of the battle. Only a leader who is tactically trained and enterprising will see the opportunity of making himself useful, whereas a leader of a different stamp will have nothing but difficulties before him in a similar situation.

For the operations against **Sandepu,** in January 1905, General Kuropatkin had given the following instructions to his cavalry: "As we are in possession of a numerous cavalry, we should conceive its principal task on days of battle to lie in its coöperating with the other arms for the purpose of winning the victory. If the corps cavalry and the mounted scouts are to rest during the day, it is necessary for their operations at night that they be notified in time of the appearance of hostile forces."

The cavalry corps assembled under Lieutenant-General Mishchenko consisted of 43½ sotnias, of which number only 11 were of the first levy. Mishchenko, instead of breaking through the chain of detachments posted on the Japanese left flank, contended himself with attacking and driving them away, one after another. On January 25th, Mishchenko appeared with 30½ sotnias and 2 batteries before **Wukiakantsy,** which was held by the Japanese with 2 escadrons and 2 machine guns.

The vanguard sotnia of the 2d Daghestan Cossack Regiment, on approaching the village, received a heavy fire from its edge. The sotnia dismounted to fight on foot and was a little later supported by the two other sotnias and a platoon of the 20th Horse Battery. The corps commander now interfered and issued the following orders: "The 20th Battery will move closer to the village. Under cover of its fire, the Daghestan Cossack Regiment will attempt to attack the village from the west. The 25th Don Cossack Regiment, supported by the 3d Don Cossack Battery, will attack from the direction of Lantsgou. The 4th Ural Cossack Regiment will advance in the direction of Siaupeiho for the purpose of reconnoitering the enemy."

Despite the artillery support, the attack of the Daghestan Cossack Regiment made no progress. The 1st Sotnia of the 25th Don Cossack Regiment attempted to charge mounted. On debouching from Lantsgou, however, it was met by such a heavy fire that it hurried back into the village, where it halted without dismounting. The remaining five sotnias, though mounted, were in the mean time standing idle in rear of the village. No one made an effort to do anything. At this moment the corps commander arrived and ordered the 1st Sotnia to dismount, to occupy the outskirts of the village and to open fire. To the 3d Don Cossack Battery he pointed out the place where it was to go into position. Finally, he even indicated the target to the battery commander. Under cover of the fire of this battery, the 1st Sotnia reached a ravine between Lantsgou and Wukiakantsy. The 26th Don Cossack Regiment, 2 sotnias of Caucasus Cossacks, and the machine guns were now

despatched from the reserve for the purpose of attacking Wukiakantsy from the south. Thereupon, Mishchenko turned to General Telichev and directed him to attack with his entire force. Telichev, however, hurt by the interference of the corps commander, gave no orders whatsoever. His chief-of-staff first proceeded slowly to the 1st Sotnia of the 25th Don Cossack Regiment to ascertain whether it still had ammunition available, and not until then did he give the order for the advance. This sotnia, however, was unable to advance, for its regimental commander did not support it, but kept his fresh sotnias back.

Meantime, the Daghestan Cossack Regiment advanced slowly, while the 4th Ural Cossack Regiment, opposed by hostile infantry at Lobou, had made a lodgment with dismounted skirmishers on the Hun River. The 26th Don Cossack Regiment had deployed its sotnias into "lava" formation, mounted, had searched the villages between Wukiakantsy and the Hun River, and was in the act of advancing against Lobou when it was recalled, as General Mishchenko wished to break off the action. At the last moment, however, Wukiakantsy was assaulted by the Daghestan Cossack Regiment and the 1st Sotnia of the 25th Don Cossack Regiment. On January 27th, the same picture presented itself. Dispersion of forces everywhere. The Japanese 5th Division, hurrying up to reinforce the Japanese 8th Division, threw out a flanking detachment to protect itself against the Russian cavalry, but, with the remainder, continued its march to the battlefield.

To protect a Russian battery that had run out of ammunition and was threatened by hostile skirmishers, the 2d Daghestan Cossack Regiment (6 sotnias of Caucasus volunteers), in reserve at Siuchiatai, was ordered to stop the attack of the hostile skirmishers by charging them in rear. On debouching from Siuchiatai, the regiment found itself on an open plain and was at once fired upon by a Japanese battery that had gone into position on the western outskirts of **Langtungkou.** The Japanese skirmishers meanwhile directed a lively fire against the Russian battery and the staff of the Russian corps commander. Exposed as it was to violent shrapnel fire, the Daghestan Regiment did not charge the rear of the advancing Japanese skirmishers as ordered, but moved against the Japanese battery. Other Japanese skirmishers now deployed from Langtungkou, in order to protect this battery, and directed their fire against the front and flank of the Daghestan Regiment. When the latter had approached to within 500 paces of the battery, its progress was stopped by a ravine with steep banks. The regiment now withdrew. Its loss in killed is not given. Its loss in wounded amounted to 70 men.

On the 28th, the Russian cavalry corps likewise allowed itself to be contained by weak hostile detachments.

The complete failure of Mishchenko's cavalry was, in the first place, due to the desire of capturing, before a further advance was made, every village that was held by a few Japanese patrols. This procedure exhausted the troops, who, even in these operations manifested a noticeable aversion to attack. A further cause of the failure of Mishchenko's

cavalry is to be found in the continual dispersion of the troops. The principal cause lies, however, in the total failure to appreciate the task falling to the lot of the cavalry corps. It should have taken a direct part in the fight of the right wing of the army. Had it done so, it was not improbable that, at least until January 26th, inclusive, a great success might have been gained. Instead, it moved farther and farther away from the army in the vain hope that it might contain approaching hostile forces, and that its mere appearance in rear of the Japanese engaged, would accelerate the latter's retreat.

Lieutenant-General Herschelmann, himself a cavalryman (Assistant to the Commander-in-Chief of the Military District of Warsaw), says: "The growth of armies increases the size of battlefields, makes more difficult the concentration of the several parts of the armies before the decisive blows are struck, but likewise requires a more thorough reconnaissance of their movements. Even local reconnaissance has grown in importance. The strength of fortified lines necessitates extended turning movements. To perceive these turning movements, or to screen them, as the case may be, is primarily the duty of the cavalry. Finally, an energetic mode of waging war requires a thorough pursuit of the defeated enemy, preferably by cavalry. With the growth of armies, the sensitiveness of their communications has increased. The threatening of these offers to the cavalry another rich field of operations. The fulfillment of these important requirements makes the attainment of modern fire effect more difficult. The mounted charge by cavalry masses has become the exception and is feasible only on exceedingly rare occasions, when led by talented leaders. The principal importance, on the contrary, must be attached to training in field service and in dismounted action, as well as on increasing the maneuvering capacity of large bodies of cavalry and on speed in their movements on the battlefield. The present training of cavalry does not conform to these requirements." General Herschelmann expresses himself, moreover, as being opposed to the high value attached to accuracy in drill. He states that the principal reason for such accuracy —the attainment of cohesion— has disappeared, for, even against cavalry, one would nowadays charge in extended order. He cites that the Cossacks have always managed to get along without a charge in close order. He believes that the intermediate formations, used in moving cavalry masses preparatory to a charge, could be dispensed with. On the other hand, General Herschelmann demands increased speed in all other movements and a charge in extended order over broken ground. He does not entirely disapprove of a certain amount of cohesion in the movements of an escadron.

In contrast to this view, General Ostrogradski emphasizes the necessity of training cavalry for battle use.

Lieutenant-General von Pelet-Narbonne* very properly concludes that, aside from showing the necessity of attaching greater importance to dismounted action, the Manchurian campaign does not offer any

**Die Lehren für die Kavallerie aus dem mandschurischen Feldzuge*, Berlin, 1908

particularly instructive tactical lessons for cavalry. He qualifies this by saying that, even to-day, "the cavalry will be able to produce a decisive effect in battle, if, massed in large units on suitable terrain, it is launched against flank and rear of the enemy." "Nowadays," he continues, "after battles lasting for days, even with troops of such stubborn bravery as the Russian, the mere appearance of cavalry may produce panics of the worst sort, which will enable the cavalry to convert the retreat of the opponent into rout and annihilation." "With the so extraordinarily increased sensitiveness of the rearward communications of the giant armies of to-day," he adds, "their destruction by cavalry will fall more heavily into the scales than formerly."

Nowadays, however, only a first class cavalry is worth its salt. The necessity of using cavalry masses, commanded by a single leader, has never before been so conclusively demonstrated—even if only by its negative results. But *much* cavalry does not yet mean cavalry in the modern acceptation of that term.

In contrast herewith, General Pédoya* of the French Army, arrives at the conclusion:

1. That the time of great cavalry charges is past;

2. That cavalry will make a much greater use of dismounted action in future; and

3. That large cavalry masses, united under a single leader, are more hampering than useful.

The unfavorable proportion of cavalry to the other arms,† the improvement of rifles and guns, the greater independence of the infantry, and the everywhere increasing cultivation of the soil, materially restrict the employment of cavalry. But these factors never restrict its employment to such an extent that its fight against the other arms would offer no chance of success. Cavalry acts above all else by the moral effect that the sudden ap-

*_La cavalerie dans la guerre russo-japonaise et dans l'avenir._ General PÉDOYA, ancien commandant du 16 ème corps d'armée. Henri Charles-Lavauzelle, Paris, 79 S. 1908. 1.50 Francs.

†The proportion of cavalry to infantry at the outbreak of war has become more and more unfavorable to the mounted arm in the course of time. But, during a campaign, this proportion changes in favor of the cavalry. In the Swedish army under Gustavus Adolphus, the proportion of cavalry to infantry was as 1: 2.3; in the army with which Frederick the Great invaded Bohemia in 1757, it was as 1: 3; in the Austrian army and the French army, in 1809 it was as 1: 8 and as 1: 4.8, respectively. In the campaign of 1866, on the German theater of war, this proportion was as 1: 8.6 in the Austrian army, and as 1: 7.7 in the Prussian army, whereas, on the Italian theater of war, it was as 1: 24 in the Austrian army and as 1: 26 in the Italian army. In 1870, this proportion was as 1: 6 in the French army and as 1: 8 in the German army.

pearance of its swiftly moving mass produces. Men have not changed, and are now, as of old, susceptible to the impressions produced by danger that threatens them unexpectedly. This susceptibility is directly proportional to the length of time the men have been exposed to the influence of a protracted combat, or perhaps a disastrous one, in which troops lose the very quality that is essential for warding off a cavalry charge.

After the cavalry has satisfied the first demands of reconnaissance, and after the opposing infantry and artillery forces have become engaged, the commander-in-chief will expect it to reconnoiter constantly on the flanks and rear of the enemy. Besides, he will expect it, at the same time, to drive away the hostile cavalry, to threaten the flanks and rear of the enemy, to keep at a distance hostile reinforcements,* to contain hostile reserves, and to disperse hostile ammunition columns. Moreover, he will demand that it reap the utmost benefit from the fire effect produced by the other arms; that it pursue the enemy until he is annihilated; and that it sacrifice itself for its own infantry in critical situations. Finally, in case a retreat becomes necessary, he will expect his cavalry to throw itself on the enemy to check the pursuit. Cavalry should guard against one fault, however, against inactivity, as this inevitably leads to defeat.

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*A French force, consisting of 3 battalions, 40 to 50 troopers, and 2 guns, which was marching from Cambray toward the battlefield of Bapaume, was delayed by 1¾ escadrons of Hussars of the Guard, by means of dismounted action. Kunz, *Nordarmee*, II, p. 39.

Although the German cavalry at Mars-la-Tour perceived in time the advance of the French IIId and IVth Army Corps, it failed to watch the enemy's movements and to retard his advance. Thus it happened that the German General Headquarters received no intelligence of the arrival of Cissey's division. Instead of the 16 escadrons and 1 horse battery actually employed, 28 escadrons and 5 horse batteries could easily have been united here. With such a force, the advance of the enemy could have been effectively checked. But the French, likewise, should have used their cavalry energetically, to drive the Prussian horsemen off the field and to advance against the Prussian left flank. *Kriegsgeschichtliche Einzelschriften*, Part 25, p. 11, et seq.

The Japanese cavalry brigade under Akiyama and the Russian cavalry brigade under Samsonov at Wafangkou. See p. 91, *supra*.

On the battlefield, the cavalry should take position where it is most likely to find most effective employment. When inactive, it should seek to take advantage of available cover by taking up a formation in groups and protect itself against losses. Moreover, it should seek to keep itself fresh for combat operations, by watering and feeding by successive units. The position chosen by the cavalry should offer it security against an unexpected attack and enable it to enter the action without delay. This, however, is assured only when the cavalry commander selects an observation point from which he can see the terrain, the enemy and his own force. He will come into action too late, if he waits until he is ordered to charge, or if he clings to his command.

The best position for cavalry to take up is one on the flank. This position enables it to move in several directions without interfering with the other arms, and to reach, by the shortest route, the line of retreat of the enemy, so as to be at once on hand to inaugurate the pursuit. When posted in advance of a flank, the cavalry threatens the enemy by its mere presence and gives the artillery of its own force a chance to occupy flanking positions. Cavalry will seek a position to the right rear or the left rear of a flank only when compelled to do so on account of its numerical inferiority, or when its task is a purely defensive one. The farther it is kept in rear, the more difficult will be its timely entry into action, the smaller the chance of its arriving in time on the battlefield at the critical moment. When posted in rear of the center of the line, cavalry either becomes a bullet stop, or it will have to be kept so far in rear, in order to avoid losses, that its timely appearance on the fighting line is problematical. If, in this case, it desires to charge, it will have to pass through the firing lines of its infantry and artillery and thereby interfere with their fire (Examples: French cavalry at Wörth; Prussian cavalry at Königgrätz) or it will

have to make a long detour in order to strike the enemy's flank. Long battle lines and lack of room may make it necessary to post cavalry in rear of the center, but, in such an event, steps must be taken to assure its timely entry into action, by agreement with the various commanders of troops in the fighting line.

*Lack of Room:* French cavalry at **Sedan.** Likewise, the Prussian 6th Cavalry Division, which, at **Mars-la-Tour,** was supporting the IIId Army Corps, as the latter was fighting without infantry reserves. The distribution of the French cavalry divisions in rear of the **Gravelotte-St. Privat** position was not judicious, because so posted, they frequently lost an opportunity to charge. The French cavalry should have been posted in the vicinity of Ste. Marie-aux-Chênes and assigned the task of checking the advance of the corps belonging to the German IId Army. The distribution, by brigades, of the 2d Cavalry Division at **Coulmiers,** must likewise be condemned. Had this division been led as a single unit, it could have checked the French deployment against Coulmiers, a task well worth the trouble.

It frequently depends on chance whether the cavalry will reach the decisive flank. When the cavalry quits the front of the army after an encounter, perhaps an unfortunate one, with the hostile cavalry, it will not be able, in every case, to choose the line by which it had best retreat. Besides, it will frequently not become apparent, until the fight is in progress, which flank is of decisive importance. Even a cavalry division that is hurrying to the battlefield from a flank, can not decide which flank is the most important one. If it happens to be on the flank on which the decision is not contemplated for the present, its movement to the other flank will consume so much time and energy that it will, in all probability, come too late anyway.*

But, no matter on which flank it may happen to be posted, the cavalry must seek to attack the enemy after the manner of an offensive wing (i. e., one bent toward the enemy). However, the cavalry will be able to main-

*Length of lines of battle: Königgrätz 12, Gravelotte 14, Liaoyang 40, Shaho 60, and Mukden 110 km.

tain itself in such an advanced position only if it has driven the hostile cavalry off the field or if it can hold that cavalry in check with a weak force. This will give rise to cavalry duels whose usefulness is frequently denied in view of the cavalry action at Ville sur Yron on August 16th, 1870. Nevertheless, these duels are necessary for the purpose of gaining information. If we assume, for the sake of argument, that there was no German cavalry on the German right flank at Mars-la-Tour, it is obvious that a charge *en masse* made by the French cavalry would necessarily have had the most serious consequences on the course of that battle. Neither infantry nor artillery was available to oppose such a charge, being no doubt employed elsewhere to better advantage, and it was therefore quite proper for the German cavalry to engage that of the French. Had this cavalry action been fought out to a finish, the victorious cavalry should have advanced immediately against the hostile infantry and artillery. However, if one has at the start neglected to drive off the field the hostile cavalry, it will make itself unpleasantly annoying and check one's own cavalry as soon as it becomes important for the latter to take a hand in the fight and to coöperate with the other arms. But the defeat of the hostile cavalry is purely a family affair and without influence on the course of the battle, if the cavalry contents itself with this first small success and does not endeavor to attain the greater and more important result of advancing, supported by its horse artillery, against flank and rear of the enemy.*

If the hostile cavalry does not accept battle, the continued molestation of its own infantry will either force it to act, or compel it to leave the battlefield. The duties of the cavalry in pursuit and retreat are very aptly described by the German regulations:

*The 4th Cavalry Division did this at Loigny. To be sure, no charge preceded its movement against the enemy's flank and rear. KUNZ, *Loigny*, p. 116. Consult also the conduct of the cavalry at Artenay, October 10th, 1870.

"After a battle is won, the most aggressive pursuit is requisite in order to reap the fruits of victory. The pursuit must be conducted with all available forces and kept up so long as there is a breath left in horse and man, until, if possible, the enemy is completely dispersed. This task will fall, in the main, to the lot of the cavalry. *When the battle nears the crisis, all cavalry units, even those of the divisional cavalry, hurry forward of their own accord, in order to be on the spot and ready for their subsequent tasks.* After a victorious battle, the bulk of the army can dispense with cavalry.

"When difficult terrain does not permit the launching of large cavalry units in tactical pursuit, the leaders of these units indicate a general objective and leave it to the brigades and the regiments to work themselves, as best they can, close to the fleeing enemy. It is then better to make local mounted charges than to do nothing.

"The leader of each cavalry unit, even though it be independent for the time being only, is personally responsible that all the measures possible in the circumstances are taken by him to keep in touch with the retreating enemy."* (Par. 514, German C. D. R.)

"When the battle terminates unfavorably, the cavalry must exert all its energy to facilitate the retreat of the other arms. This is the very situation in which an aggressive offensive on its part is requisite. Above all else, however, repeated charges against the flanks of the pursuing enemy will be worth while. Even temporary relief afforded the retiring infantry and a little time gained may avert complete defeat. To cavalry that succeeds in doing this will belong, if not victory, at least the honor of the day." (Par. 518, German C. D. R.).

**France.** General Burnez, President of the Cavalry Board, demands numerous combined exercises of the two arms in order that they may

**Dem abziehenden Feinde an der Klinge zu bleiben;* literally, to keep blade crossed with the retreating enemy.

become acquainted with one another's combat performance. General Tremeau went still farther in that he advocated cavalry charges in battle, even against unshaken infantry. "Such charges will succeed more easily nowadays than in the past, as they will be prepared by the intense fire of numerous batteries. Thanks to their exceedingly rapid course, these charges will even be able to open the door to the decisive infantry attack." The regulations do not consider the effect that the formation of large tactical units of cavalry will have on cavalry operations. Neither do they consider the expenditure of moral energy that every large engagement entails.*

It is the duty of the commander-in-chief to designate the moment when the cavalry is to be launched. On the other hand, it is the duty of the cavalry to be prepared to ride down unshaken infantry and, when the battle is about to terminate, to complete the enemy's defeat by a charge.

## 2. THE LEADER.†

Cavalry is to make the most of the success gained by the other arms and of moments of temporary weakness of the enemy. It is a fact, constantly recurring in military history, that, with the approach of a crisis in the fight, calls for cavalry either to pursue or to check the enemy become heard. It is, indeed, in the rarest cases only, that the crisis occurs suddenly and unexpectedly. Usually the approximate time and place of its occurrence may be foretold. The commander-in-chief must perceive when and where the crisis will occur and move the cavalry closer to the decisive points. Whatever losses the cavalry unavoidably suffers in such advanced positions must be

*But these views are by no means generally shared by the whole arm. Thus, to quote from an essay appearing in the May 1908 number of the *Revue de Cavalerie*, under the title, *La cavalerie dans la découverte:*

"It is not until after the battle, when the fight of all the arms has shaken the enemy, that we have an opportunity to draw saber. Then it is essential that good work be done; that the point where the force is to be launched be determined, in order to convert the retreat of the enemy into rout. . . . Lance and saber are the weapons of the nightfall of battle; it is then that they demonstrate their value and produce their legendary effect. The thrust is replaced by the cut; the flash of the blade deprives the enemy of all ideas of resistance; everything is effective: the appearance of a Don Quixote on a broken-down steed strikes the inhabitants of a whole farm with terror; four Uhlans capture a village, a French escadron a whole fortress."

†Pars. 398–407, *German C. D. R.*

borne. The cavalry leaders will have plenty of time and opportunity to become acquainted with the terrain over which they will have to charge. At any rate, however, the cavalry will be able to charge better prepared and with better prospects of success than if it first has to be brought up from the rear.

The moments that are favorable for a charge are fleeting. Every position and every movement must be calculated to enable the unit quickly to deploy in any direction for a charge. But the increased range of modern weapons compels the cavalry to remain farther away from the fighting line* than was the case during the era of Frederick the Great. Therefore, if the cavalry were to wait until the commander-in-chief ordered it to charge, it would, in most cases, arrive too late. A cavalry leader should not wait until he is ordered to charge. He should choose an observation point from which he can follow the progress of the general action and hold his force in readiness in a covered position that will enable it to advance promptly at any time.† To send officers ahead and to have them observe the battlefield is but a makeshift.

"*To see for oneself is the best plan in all situations; when charging cavalry, it is absolutely essential.*" (Par. 403, German C. D. R.). Surprise is a prerequisite to success, since, if surprised, the enemy will not have time to take adequate counter-measures to ward off the charge. Cavalry that is halted,‡ or in a formation that does not permit it to bring all of its weapons into play, or that is in the act of deploying on debouching from a defile,¶ is always a

*Charging distances: The 17th Hussars covered 2,800 m. in charging a battery of the French Guard at Vionville, and Bredow's Brigade covered 3,200 m. during its charge. The 6th Cavalry Division, which attacked at 1 o'clock P. M., covered 5,100 m., 2,800 m., of this before it arrived abreast of Vionville. After the taking of St. Privat, the 11th and the 17th Hussars had to ride 2,400 m. before they could charge and—they arrived too late.

†The conduct of the 2d Escadron of the 11th Uhlans at Loigny. KUNZ, *Reiterei*, p. 288.

‡Charge made by Bernhardi's Uhlan brigade against Tucé's brigade at Orleans. KUNZ, *Reiterei*, p. 304.

¶Genappes, June 17th, 1815. v. OLLECH, *Feldzug von 1815*, p. 181.

favorable objective even for an inferior cavalry force. The opponent will likewise be unprepared when his horses are exhausted, when he is in the act of assembling, or when he allows himself to be enticed into pursuing without reserves. To come too early is just as dangerous as to come too late.

A worthy model is the conduct of General von Seydlitz at **Zorndorf,** where that general fearlessly opposed the royal impatience with the consciousness of his own knowledge and ability to do the correct thing at the proper time. Patience and adequate preparation of a charge are what distinguished Seydlitz from Murat, who—violent, rash and restless as he was—loved to throw himself pell-mell upon the enemy wherever he found him.

"I rate personality in the arm so highly, that everything else pales into insignificance beside it; that all prognostications, all efforts to raise the importance of the arm in future war come to nothing, if provisions are not made beforehand in this respect. It is certain that, in many a man, powers never before noticed or lying dormant very frequently do not become apparent until the enemy is faced, and that there are likewise cases where fond expectations are shattered. But it is equally certain that, in the cavalry, daring and the ability to make bold decisions quickly, are far more essential than in the other arms. It is indispensable that a cavalry leader be in the full vigor of manhood; that the joy of daring be not as yet too much dulled by deliberation. He must unquestionably be picked out only from among men who still enjoy putting their horses over natural obstacles.

"The necessary tactical and strategical knowledge and confidence in leading the command that is to be entrusted to him are further prerequisites of a cavalry leader, for youth and bold riding alone do not suffice. For this reason, the scheme proposed here and there, of placing youthful officers, without regard to their length of service, at the head of cavalry divisions in case of mobilization, does not seem practicable, because the ability to lead cavalry

masses can be acquired only by practice and experience. Where experience is lacking—if we except a genius like Seydlitz—the inability of many of the young officers to fill the positions to which they are chosen in the proposed scheme, and their consequent lack of confidence in their own ability, would become apparent."*

The demands that must be made on a cavalry leader who is acting independently are extraordinarily high. Even poorly trained cavalry is capable of doing good work when led by an eminent leader. "Most of the distinguished cavalry leaders known to history," writes Prince Frederick Charles, "were between 25 and 40 years old. To be sure, most of our general officers and regimental commanders have passed this age—the fire of youth is gone; but training may, nevertheless, make up for much of this, if strength, devotion to duty and energy are combined."† As a cavalry leader is left to exercise his independent judgment in regard to taking a hand in the battle, he must possess capacity for high command and an intimate knowledge of all strategical and tactical situations. In order to employ cavalry successfully, he requires, further, a thorough knowledge of his own and other arms, great skill in leading, and correct judgment in regard to the capacity of horses. The qualities of mind and heart, without which the cavalry leader is not equal to his task, consist of extremes that are very rarely harmoniously combined in one and the same person.

"Aside from youthful agility when mounted, he must possess a keen eye, the ability of correctly judging a situation at a glance, prompt decision, a firm will and the gift of expressing the latter in clear and concise orders. He requires imperturbable patience to await the favorable

*von PELET-NARBONNE, *Die Vorbedingungen des Erfolges für die Reiterei, Supplement No. 12 to Militär-Wochenblatt*, 1904.

†Cromwell and Zieten attained high command at 45, Seydlitz at 36, Stuart at 27, and Murat at 23. General French was 47 years old in 1900, and both Rennenkampf and Mishchenko reached that age during the Russo-Japanese war.

moment just as much as he does dash and courage in recklessly launching all his forces when the time for deliberation has passed." (Par. 398, German C. D. R.).*

During a battle, the cavalry leader must be in constant communication with the commander-in-chief, in order to keep himself informed in regard to the governing tactical purpose as well as the state of the fight. He, in turn, keeps the commander-in-chief constantly informed in regard to the results of combat reconnaissance and in regard to his own measures. He must likewise keep in touch, through the medium of information officers, with events that occur in neighboring parts of the army. (Par. 70, German F. S. R.).

The leader must keep his force together and make careful provisions to counteract dispersion, which is very easily occasioned. He should launch only so much of his force as the attainment of the object in view requires.

Brigade commanders ride with division headquarters until the development begins, whereupon they join their brigades keeping in view adjoining brigades and the division commander. The commanders of the artillery and the machine guns remain with the division staff until the time of their employment. An officer from each brigade, from the artillery, and from the machine guns is attached to division headquarters to facilitate transmission of orders. The pioneer detachment is given special orders when necessary. In order to prevent mistakes, it is a good plan for those transmitting orders to repeat, on returning, to the general staff officer of the division the orders they have actually given. The headquarter's flag should be visible to the troops belonging to the command, but must not betray the position of headquarters to the enemy. As a rule, the division commander will not lead his division in person; he indicates when the reserves are to engage.

*"If you do not ride your horse like a centaur, if you do not possess the glance of the eagle, the courage of the lion, the decision of the thunderbolt, you are not fit to command a cavalry charge." FOY.

The conduct of the opposing cavalry leaders had a great influence on the issue of the cavalry action at Ville sur Yron. The French cavalry commander threw himself into the fight and was killed, whereas his opponent desisted from personal participation in the action. The superior cavalry commander can direct and lead his command only when he keeps out of the turmoil. If the leader is killed, the general staff officer or the adjutant assumes command until the next ranking officer has been notified and has arrived.

The freshness and physical condition of the horses are additional factors upon which success depends. The leader should take care to conserve the energy of his organization until the fight begins. He should, therefore, avoid useless detours, take care not to tire his horses during the march to the battlefield, and, by halting and dismounting, give them a chance to rest. Even on the battlefield, he should take advantage of every opportunity to water and feed. The cavalry should be spared unnecessary and premature losses. But it should not be withdrawn so far from the zone of effective fire that its timely entry into action would be doubtful.

Within the limits of the commander-in-chief's intentions, the cavalry leader must be left freedom of action in employing his unit as he sees fit. He should never wait for orders, but cheerfully assume the responsibility of grasping opportunities to engage. In doubtful cases, he should act on the principle that the bolder decision is, as a rule, likewise the better one. All leaders should bear in mind and should impress upon their subordinates that *omission or neglect are greater crimes than a mistake made in the choice of means.*

## 3. THE DISMOUNTED ACTION OF CAVALRY.*

Mounted action continues to be the principal combat method of cavalry. But its small arm, its machine guns and its horse artillery, endow the cavalry with such many-sidedness that it can act independently under almost any war conditions and can make itself useful in nearly every situation on the battlefield. Dismounted action, when conducted effectively and on a large scale, is expensive. The probable gain to be derived from it should be properly commensurate with the unavoidable losses it entails. For this reason, a decision to fight on foot requires the most serious consideration. Our opponents will endeavor to contest with their rifles the advance of our cavalry, and the hostile inhabitants will arm themselves, so that the cavalry will be obliged to employ its carbine more frequently than ever before. When this is the case, the leader must bear in mind that the strength of the cavalry lies in offensive action. The mounted charge produces a greater moral effect on friend and foe than dismounted action. Dismounted, the cavalry can make itself exceedingly useful, but the decision always lies in the mounted charge. Cavalry that fights on foot only, can screen properly, but it can not reconnoiter. Its efficiency will be still further reduced if its led horses get into effective hosile fire. Its armament with a long range magazine small arm,† and the employment of smokeless powder—which

*Pars. 296–388 and 452–496, *German C. D. R.*

†The insufficient armament of the German cavalry with carbines, was felt particularly during the second part of the Franco-German war, when a considerable number of inhabitants began to take part in the war. In a number of cases escadrons of Dragoons or of Hussars were attached to the regiments not armed with carbines (*Geschichte des König-Ulanen-Regiments*, pp. 72, 91–96), and patrols and escorts were formed of Dragoons and Uhlans (IUNK, *Bewegungen und das Entkommen des Korps Vinoy*, p. 30). Frequently the 4th platoons in the escadrons of Uhlan regiments were armed with captured Chassepots. (*Geschichte des Uhlanenregiments Nr. 10*, p. 204). Even regiments armed with the carbine seized Chassepots, as the needle carbine did not carry far enough. (*Geschichte der Leibhusaren*, II, p. 984). It was frequently necessary to attach infantry to the cavalry divisions, but this reduced the mobility of the cavalry. (*Kriegsgeschichtliche Einzelschriften*, Part 11. *Gen. St. W.*, I, pp. 396 and 398; III, p. 402). This procedure was successful only when the cavalry did duty in observation stations or had to hold isolated points. See p. 18, *supra.*

makes it very difficult to determine the strength of a force lodged in some feature of the terrain—have considerably increased the power of cavalry in dismounted action. But dismounted cavalry is considerably restricted as regards its freedom of movement by consideration for its led horses. Neither is it in condition to sustain the losses incident to a decisive fire fight, if it desires to continue to fulfill its proper functions. After a dismounted fight carried on to within close range, the victor will not allow the defeated cavalry to mount up. As a consequence, the escadrons dismounted to fight on foot will be annihilated. Losses in fire action impair the fighting power of cavalry, since, for every man disabled, a second one, who holds the horse of the former, falls out. It is always a good plan to deceive the enemy in regard to the character of the arm by which he is opposed. In Austria, the head-covering peculiar to the cavalry is to be fastened to the saddle, if time admits, and the field cap worn. The difficulty of replenishing the ammunition of the cavalry in front of the army should likewise not be underestimated. The leader should appreciate these difficulties, but they should never be allowed to serve as an excuse for inactivity. "No unit except one that is thoroughly master of dismounted fire action will employ its carbine with confidence. *A dismounted fight, half-heartedly undertaken, contains within itself the seed of failure.*" (Par. 452, German C. D. R.).

The combat formation is the same as that of the infantry. But in this a considerable difference must be noticed. The cavalry, taking advantage of its mobility and bringing into action, with the utmost despatch, all of its rifles, seeks to attain success quickly. Nothing is more unfavorable than for it to become involved in a protracted, vaccilating skirmish, for which its ammunition does not suffice. Such an action would, moreover, considerably weaken it for mounted action. Infantry is launched for attack in deep formation and equipped with

about 200 rounds of ammunition per man, whereas cavalry is deployed on a broad front with at most only 90 rounds of ammunition per carbine. Infantry reckons in defense with the enemy's breaking down at the muzzles of the defender's rifles; cavalry must endeavor to bring about the decision at long ranges. "The cavalry conducts its dismounted action by suddenly developing a strong fire power so as to attain quickly the superiority of fire. Therefore, the fire fight of the cavalry should not have the infantry character of an obstinate struggle, but the cavalry character of a pressing to a prompt decision. The mobility of the cavalry may be utilized even while the fight is in progress, for the purpose of influencing the tactical situation. The dismounted reserve should be restricted to the minimum size compatible with the necessities of the particular case; all other available forces should join the mounted reserve."*

General v. Bernhardi believes that an escadron at war strength is considerably superior in fire action to a company of infantry at war strength. He states:

"It is scarcely necessary to discuss which body of troops must have greater steadiness, or on which one is more likely to be able to depend in cases where moral qualities, cohesion and fire discipline are all essential. I should only like to add that, apart from all other considerations, the direct influence of the leaders in the cavalry and their supervision over their men is much more highly developed than in the infantry. It must also be remembered that there are generally fewer skulkers in the cavalry, partly because of the more thorough military training due to closer supervision and to the longer period of service, and partly because everybody endeavors not to be separated from his horse, and finds in his presence with the men of his unit the best guarantee of getting back to his mount. In view of these considerations, I believe that our cavalry is justified in claiming that it can engage the best existing infantry with reasonable prospects of success, and that it has a right to feel superior at all times to inferior infantry. With this knowledge, the scope of its activity is enormously increased."

The fear formerly entertained that the cavalry spirit would suffer through a frequent application of dismounted

*v. EDELSHEIM, *Uber kriegsmäszige Ausbildung und Verwendung unser r Kavallerie*, p. 141.

action has proven unfounded. At any rate, the squadrons of Frederick the Great and, in more recent times, the squadrons of Stuart and of Sheridan* have demonstrated that, in spite of using dismounted action, the dashing cavalry spirit was by no means impaired. The contention that dismounted action would impair the cavalry spirit was a favorite slogan employed to cover the aversion felt against using the carbine. But, be this as it may, for a handfull of partisans to check whole cavalry regiments that did not possess the means of brushing them aside was certainly detrimental to the cavalry spirit.

The drill regulations of Frederick the Great for his Cuirassiers, Dragoons and Hussars not only required that villages were to be fortified and held against hostile attacks, but demanded, likewise, that cemeteries, etc., were to be attacked and taken by cavalry. After the Seven Years' war, the king declared the 11th Dragoon Regiment (v. Mitzlaff) "to be entirely unfit for war, because it could not fire smooth volleys when dimounted." In his Instructions of March 17th, 1744, the king says: "The Dragoons, however, are to drill diligently on foot, just as the infantry drills, with all three ranks, the bayonets fixed; and they must drill as well on foot as does a regiment of infantry."

### OCCASIONS FOR EMPLOYING DISMOUNTED ACTION.

The combat methods employed by the enemy and the character of the terrain of the theater of operations are the factors that determine whether or not dismounted action should be employed. A belligerent who is prepared to operate on passable terrain that permits great freedom of movement, would do well to put prominently forward the purely mounted side; but one who may expect to encounter his enemy in the mountains or on a covered or broken plain will, whether he likes or not, be obliged to take to dismounted action, if he wishes to avoid being stalemated.

Dismounted action may be employed,—

1. In the service of reconnaissance, for the purpose

*Stuart and his squadrons fought dismounted at the battle of Fredericksburg; Sheridan did the same at Five Forks.

of forcing occupied defiles that prevent a further advance and that can not be turned except by making a detour involving loss of time.*

2. In the service of screening,† for the purpose of barring defiles or gaining localities ahead of the enemy and holding them until the arrival of friendly infantry.

3. In retrogade movements, for the purpose of delaying the enemy and forcing him to deploy.

4. When escadrons with machine guns are pushed forward to create supporting points for the deployment, to support the mounted charge by fire or to furnish a rallying point upon which the charging force, if defeated, can rally. (Par. 438, German C. D. R.)‡

5. When cavalry acts as support for artillery and when broken terrain or great fire effect of the enemy precludes successful mounted action. The cavalry of the rear guard will frequently be employed in this manner, to enable artillery to maintain its position after the infantry has taken up its march.¶

6. During the "enveloping pursuit" (par. 515, German C. D. R.), for the purpose of dispersing trains and supply columns and checking route columns until the pursuing infantry can come up. (See p. 86, *supra*).

7. To molest by fire hostile route columns in order better to ascertain their strength, to impair their cohesion, and to delay them by forcing them to deploy or to deviate from their march direction.§ *Fire surprise.* (Par. 471—473 and 497, German C. D. R.)

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*Dismounted action of the 16th Hussars at Voncq, north of Vouziers, August 29th, 1870. *Gen. St. W.*, II, p. 1031. KUNZ, *Reiterei*, p. 184.

†Pars. 194–198, *German F. S. R.—Taktik*, IV, pp. 185, 198 and 207.

‡French Chasseurs à cheval at Busancy, August 27th, 1870. KUNZ, *Reiterei*, p. 181.

¶The Austrian brigade under Appel at Gitschin in 1866.

§The engagement of Liebenau, June 26th, 1866. An escadron of Prussian Hussars that had dismounted in rear of some abatis on Semmel hill, was mistaken for infantry, caused the advance guard of the 7th Infantry Division, consisting of the 4th Battalion of Jägers and the 72d Infantry (*Geschichte des Regiments*, p. 51), to deploy and delayed it three-quarters of an hour.

French Dragoons on Kaninchen hill at Forbach, August 6th, 1870. See p. 129, *infra*.

Hussars of the Prussian Guard at Bapaume, January 30th, 1871. KUNZ, *Reiterei*, p. 241. The approaching French reinforcements were delayed. See p. 97, *supra*.

8. To deceive and molest the enemy (by surprising him with fire directed against his flanks and rear) in action and in camp, and to carry out surprises both by day and by night, particularly in rear of the hostile army. To support the infantry in battle by taking the utmost advantage of mobility. A cavalry division that develops its whole fire power on a flank or in rear of the enemy, may produce a decisive effect.*

9. To defend its own cantonments (in Italy, in addition, to enable it to mount up), and, in the service of security to spare the horses undue hardships.

The general principles governing the use and conduct of dismounted action are similarly expressed in all the drill regulations. But a special fondness for the use of the fire arm is perhaps not unjustly ascribed to the Russian cavalry. The Russian regulations do emphasize repeatedly, to be sure, that the cavalry is to solve, by means of mounted action, the problems falling to its lot, and that its use in dismounted action is to be restricted to exceptional cases. But the thorough infantry training that the Russian cavalryman receives as regards dismounted drill and even bayonet fencing, the rifle and bayonet of the Dragoons, and the frequent mention of hand-to-hand combat when fighting on foot, force the cultivation of dismounted action more into the foreground.

## FORMATION.

The escadron is the tactical unit for dismounted action. Larger organizations are formed abreast, as a general rule, so as to preserve order and facilitate regaining the led horses. If employed in echelon formation, all units would be disordered to such an extent in action that their subsequent employment immediately thereafter would have

*The attack made against Chenebier, January 17th, 1871, by French infantry and dismounted troopers of the 5th March Dragoons. KUNZ, *Entscheidungskämpfe des Generals von Werder*, II, p. 129, *et seq.*

to be dispensed with. The unit designated for dismounted action is formed into *skirmishers*, when requisite with supports, *led horses*, a *mounted reserve*, and, when necessary, a *dismounted reserve*.

Dismounted or mounted *combat patrols* observe on the flanks. (Par. 338, German C. D. R.).

### DISMOUNTING TO FIGHT ON FOOT AND MOUNTING UP.*

The number of carbines that a unit can bring into action depends upon the degree of mobility of its led horses. The circumstances of each individual case determine which is more important: whether to develop as great a fire power as possible, or whether to retain the ability quickly to resume mounted action. Another factor of importance is, whether or not the led horses can be posted in the vicinity under cover. It may sometimes be a good plan in such situations to designate a greater number of escadrons for dismounted action, but to have them dismount half of their men only. Ordinarily, one-half of the troopers (the odd numbers,† according to par. 365, German C. D. R.) or three-fourths (par. 366, German C. D. R.) dismount. In the last-mentioned case, each horse-holder (the trooper on the left flank of each rank) leads not more than four horses. These he can lead at the walk, while at the same time carrying on his shoulder the lances fastened together with an arm strap. This makes it possible to execute minor changes of position, and to keep at a distance hostile patrols by means of a few dismounted troopers. When the led horses are secure against molestation in the immediate vicinity of the fighting line, there is no reason why the number of horse-holders

*Pars. 454 and 364–368, *German C. D. R.*

†The fact that horses are more easily led from the right is of trifling importance. The dismounting proceeds more rapidly when executed from column of twos—in which case the platoons move into their respective sections—than when executed from line.

should not be further reduced. Definite rules showing when one-half and when three-fourths of the troopers should be dismounted to fight on foot, can not be given. The conflicting requirements of fire power and mobility must be harmonized in each particular case.

The led horses retain the same relative positions as the platoons to which they belong. The leader of the led horses must keep himself informed in regard to the progress of the action, and must take care to ward off hostile patrols by means of sentries. Moreover, he must facilitate the prompt mounting up of the skirmishers, by forming his led horses in an orderly manner, platoons and ranks being kept distinct and a proper distance apart.

The lances are laid on the ground—when in line, in advance of the ranks, when in column, on a flank—in such a manner that they can not be damaged by the horses. Unless otherwise ordered, the first sergeant and the non-commissioned officers posted on the left flanks of platoons remain with the led horses, in addition to the horse-holders.

An escadron of 140 troopers can bring into action from 70 to 105 carbines, and a regiment, if one escadron is retained as a mounted reserve, from 200 to 300 carbines, i. e., approximately the equivalent of one company. A cavalry division, if one regiment is kept out as a mounted reserve, can develop a fire power equivalent to that of two battalions of infantry.

If the troops are to mount up after their mission is accomplished, the tactical situation, cover, and the degree of mobility of the led horses will determine whether they can be brought up to meet the skirmishers, or whether the latter should fall back upon the led horses. By sending to the rear men that can be spared, even led horses that possess little mobility can be quickly brought up. The carbine remains slung on the trooper's person for the time being.

### SKIRMISHERS, SUPPORTS AND DISMOUNTED RESERVE.

The troopers who have dismounted form by platoons either in front of the escadron or on that flank of the column on which the escadron commander happens to be. The men of two mounted platoons form one dismounted platoon, which is in turn divided into squads of four files each. A range finder joins each platoon commander. When dismounted, the escadron may be formed either in line, or in line of platoons in columns of squads. The methods of extended order fighting correspond to those of the infantry. If several escadrons are sent into action, each provides for distribution in depth (supports). In some cases a dismounted reserve may be required for the purpose of launching it where a weak spot of the enemy develops during the progress of the fight or where the point that is decisive for the attacker is perceived. It will frequently be practicable to dispense with it entirely until it is required, and then to take it from the parts of the force that have remained mounted. By taking the dismounted reserve from the parts of the command that have remained mounted, one preserves until the last moment the principal advantage of cavalry, mobility.

At the commencement of an engagement, care must be taken that sufficient ammunition is provided. To this end, the ammunition carried by the horse-holders (45 rounds per carbine) must, in the first place, be turned over to the skirmishers, provided this does not delay the opening of fire. Furthermore, ammunition should be obtained from other troops, when necessary, or the ammunition wagons brought up. (Par. 462, German C. D. R.).

Those portions of the command that have not dismounted constitute the *mounted reserve.* This may be used either mounted or dismounted. It continues the combat reconnaissance, covers the led horses, and may be used offensively to good effect against the flanks of the enemy, or, if the opposing force consists of dismounted cavalry, against its led horses. When the action is being broken off, it covers, either mounted or dismounted, the mounting up.

**Armament with Fire Arms.**

| | *Germany.* | *Austria.* | *Italy.* | *France.* | *Russia.* | | *England.* |
|---|---|---|---|---|---|---|---|
| | | | | | *Cossacks.* | *Dragoons.* | |
| Year of construction | 1898 | 1890 | 1891 | 1890 | 1896 | 1891 | 1903 |
| Weight in kg. | 3.6 | 3.3 | 3. | 3. | 3.28 | 3.8* | 3.7 |
| Length in cm. | 100.5 | 100.5 | 92. with bayonet 126. | 94.5 | ..... | 116.6 | ..... |
| Caliber, in mm. | 8. | 8. | 6.5 | 8. | 7.62 | 7.62 | 7.7 |
| Sight graduated up to, m. | 2,000 | 1,800 | 2,000 | 2,000 | 1,600 | 1,920 | 1,800 |
| Bayonet | ..... | ..... | † | ..... | ..... | ‡ | ..... |
| Magazine is loaded by | clip hold'g 5 rounds | frame hold'g 5 rounds | frame hold'g 6 rounds | frame hold'g 3 rounds | clip hold'g 5 rounds | clip hold'g 5 rounds | ..... |
| Ammunition carried by each man | 45 | 80¶ | 96 | 66 (Cuirassiers, 48) | 45 | 45 | 100 |
| Weight of ammunition in g. | 1,135 | 1,582 | 1,400 | 1,980 (1,440) | 1,010 | 1,010 | 2,975 |

Cavalry must endeavor to place its led horses as close as possible to the firing line, in a sheltered position per-

*The rifle with bayonet fixed weighs 4.094 kg., and is 160.8 cm. long.

†The bayonet is attached to the rifle by means of a hinge and when not in use is folded back so as to lie along the stock.

‡The bayonet is detachable.

¶The trooper carries 20 rounds in his cartridge pouches and 30 rounds in the saddle bags.

mitting covered communication between skirmishers and led horses. It is particularly important that the position chosen for the led horses be sheltered from artillery fire. When attacking dismounted, cavalry becomes separated from its horses. They should, therefore, be so posted that the dismounted force need not worry about them. In any event, a threat against the led horses should not cause the force of the attack to be impaired. In defense, it will frequently be practicable to keep the led horses very close to the firing line. But even in this case, they should be posted under cover and due consideration given to the necessity of mounting up quietly without interference on the part of the enemy.

The initial velocity, the accuracy and the beaten zone of the carbine are smaller than in the infantry rifle. If dismounted cavalry hopes to engage infantry successfully, it requires a weapon that has the same range as that of the infantry, and likewise a bayonet. The lance, if taken along by the trooper when dismounted to fight on foot, would hamper him too much. For prompt dismounting, it is an advantage if carbine and ammunition are carried on the trooper's person.

## Provisions of Various Regulations.

**Austria.** Two methods of dismounting are used.

*First method* (the led horses being immobile in this case): The front rank advances a distance of ten paces and dismounts. The horses on the flanks are then moved forward and each rank forms a circle, each horse being linked, by means of the halter-strap, to the horse on its left. One trooper, who is first relieved of his carbine and ammunition, steps into the circle.

*Second method:* Numbers 1, 2, and 3 dismount. If time admits, the troopers relieve themselves of their sabers and put on their field caps. The regulations prescribe that more troopers than are absolutely required should not be dismounted to fight on foot. No dismounted reserve is to be retained. Escadrons are the tactical units in dismounted action. They are not to be combined into larger units, when dismounted. A mounted reserve (in an escadron, a platoon, in larger units, an entire escadron) is always to be provided. The frontage of a platoon dismounted to fight on foot is given as approximately 50 paces (38 m.).

*Kinds of fire used:* Volleys by squad and by platoon, and fire at will. The latter is the principal fire used. Decisive fire is to be used only at close ranges (up to 600 paces) and at mid ranges (up to 1,200 paces=

900 m.). Long range fire is to be employed only when ordered by the escadron commander. Squads are to advance by rushes. When the dismounted force is to mount up, the led horses are to be brought up, if practicable.

**France.** An escadron retains one platoon, a regiment one to two escadrons as a mounted reserve. In the other platoons, either all the men or only the even numbers dismount. In the former case, one horse-holder is detailed for each rank. When Dragoons dismount to fight on foot, the lance remains in its boot at the stirrup and is fastened to the saddle-bags by means of a hook attached to the arm-strap. When only a small number of skirmishers is required, one to two platoons may be designated for dismounted action. In certain circumstances (when surprised or when it is essential to get away quickly), it may be a good plan to dismount, hold the horses by the reins, and, after firing a few shots, mount up again. When the led horses (*chevaux haut le pied*) can be posted under cover in the immediate vicinity of the skirmishers, two horse-holders suffice for each platoon. If the platoons of an escadron fight separated from one another, it will likewise be advisable to divide the led horses into corresponding groups. In defense, the firing line is to be made as strong as possible, a support comprising one-third of the force being kept out. Closed bodies are to move in column of fours. When the skirmishers are to mount, the led horses are to be brought up to meet them.

*Kinds of fire used*: Volley fire (in exceptional cases only; under no circumstances at close ranges); fire at will (*feu à volonté*); short and violent bursts of fire (*par rafales violentes et courtes*); and rapid fire (*feu rapide*).

**Russia:** The Dragoons (armed with rifle and bayonet) in the first place, the Cossacks in the second, are designed for dismounted action. The platoon is the tactical unit in dismounted action. Ordinarily, in dismounting to fight on foot, number two in each set of threes remains mounted, i. e., two-thirds of the unit is available for dismounted action. When a greater proportion of the unit is to dismount (a procedure to be employed when good cover is available for the led horses, and when the latter will not, in all probability, have to change position), only number two of the rear rank of each set of threes remains mounted, i. e., five-sixths of the unit is available for dismounted action. When necessary, the number of horse-holders may be still further reduced. Each escadron retains one platoon, each regiment one escadron as a mounted reserve. When the dismounted force is to mount up, the led horses (if mobile) are to be brought up to meet it. In the Cossacks, when a greater number of troopers than usual is to dismount to fight on foot, the horses of a platoon are linked—the so-called dismounting with the *batowka* of the horses. In this case, only one horse-holder remains with the led horses of the platoon, and one non-commissioned officer, in addition, with those of each sotnia. The procedure is as follows: The odd numbers advance eight paces; then all the troopers

of the front rank execute a left about, while, at the same time, each trooper of the rear rank leads his horse forward until its head is in line with the saddle of that of his file leader. The reins of each horse are then drawn through the cincha of the one opposite, placed over the cantle of the saddle, and drawn taut. When tied together in this manner, the horses can move and turn as much as they like, but they can not run away. The Cossacks employ a third method of dismounting, that of dismounting in a circle. In this, the sotnia, in single rank, forms a circle; the men dismount; the horses lie down; and the troopers use the horses as cover and as rifle rests. This method of dismounting is to be used in exceptional cases only, when a unit is surrounded on open terrain by hostile cavalry, and is required to hold its position until the arrival of reinforcements. The same kinds of fire are used as in the infantry. Closed bodies are to fire volleys only.

**Italy:** The escadron is the tactical unit in dismounted action. When the led horses are immobile, all the troopers, with the exception of one horse-holder for each rank, dismount to fight on foot. When the led horses are mobile, from one to three troopers out of every four may be used for dismounted action.

In dismounted action, an escadron is divided into dismounted platoons (*plotoni appiedati*) of two squads (*squadri*) each, into the led horses (*cavalli a mano*) and the mounted reserve (*sostegno a cavallo*). Lancers fasten the lance to the right stirrup and the cantle of the saddle, on dismounting.

The following methods of dismounting to fight on foot are used:

1. All the troopers, with the exception of one horse-holder for each platoon, dismount. The horses are linked.

2. Number three of each set of fours acts as horse-holder; the rest of the men dismount.

3. Number three of the rear rank of each set of fours turns over his horses to his file leader and dismounts with the rest of the troopers.

4. Either all the even or all the odd numbers dismount.

**England:** Either one-half or three-fourths of a unit may be dismounted to fight on foot. Fire against skirmishers is permitted only up to 300 m., against larger targets up to 700 m. On open ground, led horses are to be kept not more than 500 m. from the firing line. The horses are to be specially trained in moving as led horses, so as to be able to follow the dismounted skirmishers at a fast gait.

*When a mounted reserve is not kept out, an escadron of 140 troopers can dismount to fight on foot, the following:*

In **England** and **Germany:** 70—105 men;

In **Austria, France** and **Italy:** 70—132 men;

In **Russia:** *Dragoons:* 94—117; *Cossacks:* a maximum of 135 men.

## THE ATTACK.

Most of the dismounted actions that cavalry has fought, have been attacks. In its operations in front of an army, cavalry will undertake a costly attack, necessitating the expenditure of a great deal of ammunition, only if it can not force a passage in any other way (by making a detour or by awaiting the effect produced by its artillery), or if it is opposed by a weak opponent. Expeditions against the enemy's rearward communications, such as the seizure of railway stations and depôts, the destruction of artificial structures, and the capture of isolated posts, etc., will likewise result in dismounted attacks on the part of the cavalry. In a battle, on the other hand, it will be comparatively rare for dismounted cavalry to be launched in attack. The attack order (par. 462, German C. D. R.) is not issued until all the circumstances bearing on the situation have been thoroughly weighed, the terrain over which the attack is to be made, artillery positions, attack sections, thoroughly reconnoitered, and the point where the development of the force is to begin, determined. The attack order must assure the coöperation of all parts of the command. Each tactical unit is assigned a definite mission. Each is, in addition, assigned the front upon which it is to deploy and an objective. When necessary, the order should specify where the dismounted reserve is to be posted. The replenishment of ammunition should be regulated; ammunition wagons should be brought up and their contents, if time admits, issued to the attacking troops. The disposition to be made of the ammunition in hands of the horse-holders should be indicated. In certain circumstances, some instructions in regard to the position of the led horses are necessary (for example, for them not to advance or not to retire beyond a certain line). The mounted reserve is either ordered to cover the led horses, or directed to advance

offensively with the bulk of its force against the flank and rear of the enemy.

The superiority of the cavalry lies in its mobility, and it should take advantage of this mobility in attack more than anywhere else. From this it follows that the dismounted attack should be directed against a point (hostile flank or rear) where it is not expected, and that the attacking force should advance rapidly to most effective range, the several escadrons or platoons, in open order formation, endeavoring to reach the points at which they can take up the fire fight with prospects of success. A slow advance in thin skirmish line that becomes gradually more and more dense, is incompatible with the nature of cavalry. In the Boer war, English mounted infantry frequently managed to gallop close up to the defender, to dismount, and to send back its led horses to cover. Dismounted cavalry, supported by its horse batteries and machine guns, attacks the enemy in front as above described, but does not venture on unfavorable terrain devoid of cover. While the enemy is thus held in front, the bulk of the cavalry endeavors to direct, either mounted or dismounted, a sudden and unexpected blow against his flank and rear. This alone may compel the enemy to desist from further resistance. When local reconnaissance is efficiently performed, cavalry can quickly withdraw itself from a critical situation. This requires, however, that a strong mounted reserve be provided when the combat is initiated.* If the opponent consists of dismounted cavalry, this reserve may be launched mounted to capture his led horses; if hostile infantry is to be driven away, it may be launched dismounted. Finally, parts of the mounted reserve may be employed as a dismounted reserve, if during the progress of the fight a weak spot of the enemy or a point of decisive importance to the attacker

*Contrary to the practice of infantry, an attack by dismounted cavalry is to be made in the direction of march in exceptional cases only.

is perceived. If cavalry were to go into action at the outset in deep formation, like infantry, it would sacrifice its principal weapon—mobility. A fire fight that is systematically fed is incompatible with the nature of cavalry. Cavalry will endeavor to form at the very start long but effective firing lines, in order to break down quickly the resistance of the enemy and to regain its own freedom of movement; therefore, it should bring into action as many carbines as possible. The dismounted attack, however, requires mobility on the part of the led horses. These must be quickly brought up from their sheltered positions, which are, as a rule, some distance in rear, so that, if its attack is successful, the cavalry may again be free to move. The object of bringing into action an adequate number of carbines is sought to be attained by dismounting a greater number of escadrons. This procedure is open to the objection that the strength of the mounted reserve is thereby reduced. Moreover, there is a limit to its application—the available strength of the force. In many quarters it is believed that the problem of obtaining an adequate number of carbines for the firing line may be solved by having the mounted reserve bring up the led horses. But, is it likely that the mounted reserve will be on hand immediately after a victory? Will it not be more profitably employed elsewhere in reaping the fruits of victory? The firing line is to be pushed close to the enemy according to infantry principles. Cavalry attacking dismounted should likewise not shrink from making an assault. But, if a hand-to-hand combat actually takes place, it will be in a critical situation, indeed, as it is not equipped with a bayonet. Even a bayonet fixed on the carbine can not convert the latter into an effective thrusting weapon. The lance, on the other hand, is too unwieldy for dismounted work, and the saber, if carried along, would hamper the movements of the dismounted trooper. Cavalry will endeavor to make its dismounted assault

in conjunction and simultaneously with the launching of its mounted reserve. The latter will then take up the pursuit. As soon as the position is taken, the leader must make every effort to mount his unit again, but he must likewise see to it that the possession of the position is properly assured. If practicable, the led horses are brought up at a fast gait. When this can not be done, only a part of the skirmishers is at first sent back to the led horses.

**England:** The cavalry is to ride rapidly close up to the enemy and to surprise him, using for this purpose covered avenues of approach. It is then to dismount quickly and to develop an overwhelming fire. The firing line is to advance by irregular rushes made by small fractions, or by crawling, supported in either case by the fire of neighboring groups.

**Russia:** When practicable, the cavalry is to dismount not more than 1,000 m. from the hostile position. The decisive range of 560 m. is to be gained as quickly as possible. On open ground, when the dismounted force arrives within 1,200 paces (850 m.) of the enemy, the advance is to be made by rushes. These are not to exceed 100 paces each, in length. Between 200 and 100 m. from the enemy, the fire is to be increased to the utmost intensity. From here on, fire while in motion is to be used. When a point 35 m. from the enemy is reached, the assault is to be made with a cheer. Cossacks are to use the saber in the assault. The firing line of an escadron, from one to three platoons in extended order, covers a front of 70 to 85 m. The supports follow either in close or in extended order, 350 m. in rear of the firing line. In a unit larger than an escadron, dismounted escadrons may, in addition, be provided to reinforce the firing line, to make a bayonet attack, or to ward off a sudden hostile move.

**France:** "The cavalry fights on foot when the tactical situation or the terrain prevent it from fighting mounted. It is, therefore, to use dismounted action in all cases where that course appears desirable for the fulfillment of its mission. But it should never look upon dismounted action as an excuse for evading hand-to-hand combat." The Firing Regulations of 1903 add: "The cavalry, thanks to its mobility, can avoid losses, appear at a point where it is not expected, open fire suddenly, break off the action when necessary, begin it elsewhere, and repeat its attacks, without allowing itself to be held."

The regulations emphasize, in addition, that the dismounted action is always to bear the stamp of the cavalry spirit of the offensive. They recommend sudden appearance and prompt display of strong fire power in dismounted attack. They enumerate the following cases in which the latter may be employed: Forcing of crossings whose turning would consume too much time; prompt occupation of important positions;

penetration of hostile covering lines; molestation of hostile route columns; sudden attacks on quarters or camps of hostile troops; capture of convoys; etc. Ground swept by hostile fire is to be crossed at the gallop.

### FIRE SURPRISE.*

Fire surprise is the combat method most in keeping with the mobility of cavalry armed with a long range fire arm and supported by artillery and machine guns. Whether the fire surprise is conducted by the artillery alone, under cover of the cavalry, or whether all the arms participate, depends upon the situation. Pushed close to the enemy by a skillful use of accidents of the ground, the force whose fire bursts forth all at once, can seriously shake his morale. It is essential that heavy losses be at once inflicted on the enemy, in other words, that the fire of the assailant produce an effect at mid ranges. Horse artillery and machine guns should not open fire prematurely. It is advisable to assign their subsequent targets to them. When in any way practicable, the fire action should be followed by a charge. Large units, in particular, should endeavor to bring about a charge, as it is difficult to deploy a considerable force in close proximity to the enemy. In fire surprises, even small units will find an opportunity to make themselves very useful against reserves and ammunition columns of the enemy.

The led horses had best be kept immediately in rear of the skirmishers. If the operation is successful, and a reverse should take place, cavalry will then be able to withdraw itself quickly from the critical situation.

### DEFENSE.

In defense, cavalry may be required to delay an advancing enemy, to maintain positions or villages until the arrival of the infantry, to obstruct a hostile screening line (par. 196, German F. S. R.), or to ward off attacks made

*See *Tactics*, I, KRUEGER'S translation, pp. 151 and 330.

against its own cantonments. In battle, one will only with reluctance permit cavalry to fight dismounted, shoulder to shoulder with the infantry. It will frequently fall to the lot of cavalry to delay the march of hostile reinforcements, to divert them from their march direction (by taking up a flank position) or to prevent their advance (by throwing itself across their path).

When the action is fought simply with the object of gaining time, all measures calculated to deceive the enemy —such as hiding the led horses, and concealing any evidence that might betray the fact that the enemy is opposed only by cavalry—increase in importance. Upon this is based the necessity for the adoption of the gray field uniform for the cavalry. (See p. 5, *supra*). Timely provision should be made for breaking off the action. A premature and complete occupation of a defensive position should be avoided. The best plan is to occupy at the outset only a few points, and to keep the bulk of the force in a position in readiness. The partial occupation of a defensive position makes it possible to defend a broad front when the enemy is at long and mid ranges, and deceives him as to the strength of the defender. It is impossible to lay down definite figures for the extent of front to be occupied in defense. There is no objection to assign to an escadron a front of approximately 200 m. Machine guns may be distributed by platoons. In like manner, one will frequently let batteries of artillery fire by platoons, or even by piece, from a concealed position, for the purpose of deceiving the enemy. Units that are to protect a flank, are echeloned in rear of it; whether they are employed mounted or dismounted will depend upon the tactical situation and the terrain. After the hostile attack has been repulsed, such units enable the defender to assume the offensive and to take up the pursuit. It is particularly important that measures be taken for the protection of the led horses. A mounted reserve is nearly

always necessary, for the purpose of enabling the skirmishers to break off the action, if for no other reason. Cavalry that fights a defensive action, is in danger of being held in front at short range by the enemy, while the led horses are attacked by the mobile parts of his force.

The defense will have the character of a containing action. When engaged with hostile infantry, dismounted cavalry will be able to mount up only when the enemy has not as yet approached too close. For these reasons, the cavalry will endeavor to use its carbines at ranges up to the maximum sight graduation and to equalize any existing numerical inferiority by a greater expenditure of ammunition. In other words, cavalry will endeavor to maintain a lively fire at will even at long ranges. If the enemy is once permitted to get to close range, he will soon perceive that he has to contend only with dismounted cavalry, and attempt to bring the fight to a conclusion in short order. It must be borne in mind that carbine fire, especially when directed against upright targets the height of a man, gives good results at mid ranges, but that the better marksmanship training of the infantry is bound to make itself felt when once the hostile infantry has been allowed to approach to the lower limit of mid ranges. (Par. 452, German I. D. R.). Even a comparison of the results of target practice shows that infantry fire is very decidedly superior at short ranges to carbine fire. On the other hand, the efficacy of the carbine must not be underestimated by the infantryman, if he wishes to avoid laying himself open to very painful reverses when attacking dismounted cavalry.

Similar views are entertained in **Austria** and in **France.**

**Russia:** The fire is to be withheld until the enemy arrives within short range. The fire fight is to be fought at ranges from 560 to 140 m. If the object of the defense is merely to contain the enemy, the action is to be broken off when the assailant has approached to within 250 m. Otherwise the decision is to be brought about by a frontal counter-attack with the bayonet when the enemy has approached to within 25 paces

of the position. If the counter-attack is successful, the advantage gained is to be followed up with fire and, in conjunction therewith, a mounted pursuit. If the counter-attack is repulsed, the cavalry will be in an exceedingly uncomfortable situation; the led horses must be moved to the rear, and nothing but prompt action on the part of the mounted reserve can make possible the retreat of the force.

**England:** "The troops must be capable, mounted as well as on foot, of quickly changing position under cover. They must likewise be capable of evacuating a position without it being perceived by the enemy. One can best deceive him in regard to such a movement, if it is undertaken suddenly immediately after deluging him with a violent burst of fire."

## BREAKING OFF THE ACTION.*

It will be comparatively easy to break off the action if, favored by the terrain and one's dispositions, one succeeds in deceiving the enemy as to one's intentions, and if the led horses are close at hand and can be brought up quickly. In many cases, one may deceive the enemy by sending back only a few men, who then bring up the led horses. The retirement by combat groups (par. 490, German C. D. R.) invites the enemy to a more energetic advance. It would be better, therefore, to retire all along the line under cover of an offensive wing, after developing a strong fire, and to hurry to the led horses. Dead angles located in front of the position are especially valuable.

When exposed to effective fire at close range, the defender can break off the action only if the retirement can be effected under cover or under the protection of fresh troops that enter the fight. To break off an action in attack, even at mid ranges, requires specially favorable terrain. At short ranges, it will be more expensive to retire than to fight the action with determination to a finish. Artillery and machine guns cover the retreat by drawing upon themselves the enemy's fire and by preventing his forces from pursuing. They ought not to shrink from sacrificing their guns and machine guns to save their sister arm. Attacks by a reserve against the flanks of the pursuing enemy,

*Pars. 490–496, *German C. D. R.*

whether they are made mounted with the *arme blanche* or dismounted with the carbine, will considerably facilitate the retreat. When once the led horses are reached, the force seeks to withdraw itself quickly from the pursuing fire of the enemy. Horses whose riders have been disabled are taken along. As soon as the force has broken away from the enemy, every effort must be made to get it again well in hand.

## EXAMPLES OF THE EMPLOYMENT OF DISMOUNTED ACTION.

The dismounted action of French Dragoons on **Kaninchen Hill at Forbach,** August 6th, 1870.

The protection of the Saarlouis—Forbach road, which passed in rear of the French position on Spicheren Heights, and which was used by the 13th Prussian Infantry Division in its advance, was entrusted to Valazé's Infantry Brigade and one pioneer company which had constructed a line of trenches about 1000 m. long on Kaninchen Hill. When Valazé's Brigade was brought up to the battlefield in the course of the day, there remained in the position:

| | | |
|---|---|---|
| The pioneer company | 150 men | —with 80 rounds of ammunition apiece; |
| Two escadrons of the 12th Dragoons* | 170 men | —with 20 rounds of ammunition apiece. |
| | 320 men. | |

On receiving information of the approach of a hostile column, the trenches were occupied. The Dragoons dismounted 120 men, leaving behind 50 men as horse-holders. At 5:30 P. M., fire was opened on the Prussian advance guard, which deployed, its skirmishers finally getting within 250 m. of the French position. At 7 P. M., the defenders received an unexpected reinforcement in the shape of 200 Reservists, which arrived at the railway station of Forbach, and of one field battery, which fired a few shots. The retreat to Forbach was begun at 7:30 P. M., the railway embankment being held until 9 P. M. The retirement into the second position was covered by a charge made by the Dragoons, which had quickly mounted up.

The records give only the losses of the Dragoons. These amounted to 2 officers and 17 men killed, 2 officers and 5 men wounded, and 30 horses disabled. The fire of the Prussian infantry, directed from low

*Three platoons were in observation near Emmersweiler.

ground against a completely sheltered opponent in position on high ground, produced only an insignificant effect. On the Prussian side, the 55th Infantry lost 3 officers and 85 men, and the 7th Jäger-Battalion, 7 men. But the advance of the 13th Division was, in this manner, delayed by a weak opponent, whose strength was considerably overestimated. A participation of this division in a pursuit, might have had important results.*

The following instances of the employment of dismounted action in the **Franco-German war** may be cited: The attack on **Theillay le Paillux,** December 12th, 1870. A platoon of the 4th Hussars (whose regimental history contains an interesting account of a number of dismounted actions) captured the railway station at **Bec Oiseau,**† on September 15th, 1870, **Draveil,**‡ on September 16th, 1870, and **Maison Affort.**¶

On January 18th, 1870, the 1st Escadron of the 11th Hussars captured **Ferrières.**§ The southern portion of this village was taken without difficulty. Then a stronger resistance was encountered. This was overcome after some horse-holders had been brought up as a reinforcement. The loss amounted to 11 men killed and wounded, and 4 horses killed.‖

On July 7th, 1877, General Gurko, advancing with the advance guard corps, found **Tirnova** occupied by a hostile force consisting of 2,000 infantry, 500 cavalry, and 6 mountain guns. A brigade of Dragoons dismounted to fight on foot and deployed under cover of the fire of the artillery, which had a support of dismounted Dragoons, while the Cossacks turned the flanks of the Turks. The Turks evacuated the place before the brigade of Dragoons could effectively engage them.°

On January 25th, 1905, one regiment of Akiyama's cavalry brigade was to hold **Sandepu** for six hours against two Russian rifle regiments until the arrival of the reinforcements sent by General Oku. The regiment lost all of its horses; those not killed outright were frightened by the violent artillery fire and stampeded. Thus, the Japanese cavalry perhaps saved the entire IId Army from being rolled up. Details are, unfortunately, lacking.

Mishchenko's attack on Yinkou on the evening of January 11th, 1905, with fifteen escadrons and sotnias and four scout detachments, though faulty in plan and half-heartedly executed, shows what cavalry can do.

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*_Gen. St. W._, I, pp. 367–390. _French Gen. St. W.: Bataille de Forbach_, p. 146.

†_Geschichte des 4. Husarenregiments_, p. 147.

‡_Ibid._, p. 148.

¶_Ibid._, p. 149.

§_Geschichte des 11. Husarenregiments_, p. 322.

‖KUNZ, _Reiterei_, p. 222.

°_Russisch-türkischer Krieg (Gen. St. W.)_, II, p. 152, _et seq._ Engagement at Kasanlik, July 17th, 1877, _Ibid._, p. 181.

## ENGLISH VIEWS ON THE EMPLOYMENT OF MOUNTED INFANTRY.

The need of having, in addition to cavalry trained for battle use, a very mobile force that can shoot well, has been felt in all wars. In the continental states of Europe, an attempt was made to fill this want by training cavalry more thoroughly in dismounted action, and by assigning to it cyclists and machine guns, whereas, in England, special bodies of mounted infantry were formed. The principal drawback to the employment of mounted infantry is, however, that, when mounted, it is defenseless against cavalry, and that, while in motion, it really needs a supporting force. In the Boer war the mounted infantry grew finally to a strength of 50,000 men.* As it was not confronted by cavalry, it made good during the execution of wide turning movements, which Lord Roberts employed with success for the purpose of striking the flank of the Boers, who always rapidly extended their lines. In spite of these good services, it could not be denied that mounted infantry had many faults. The men knew nothing of the care of their mounts, as is evidenced by the large percentage of horses that became unserviceable. As mounted infantry units were improvised bodies, they lacked the requisite training in marching and tactical employment. After the war had lasted for some time, the mounted infantrymen, however, had completely forgotten their infantry character and deported themselves like cavalrymen, even if only as poor ones. Thus, we find toward the close of the campaign numerous mounted charges made by mounted infantry on the British side, as strange to relate, also on that of the Boers.

*As there was a disproportionately large force of artillery in the several columns during the last stages of the Boer war, eighteen batteries were transformed into mounted infantry. At the close of the war, the British army consisted of 247,270 men, of which number 67,898 men were mounted. Of the latter, 28,244 men belonged to the regular establishment (16,256 cavalrymen, and 9,083 infantrymen and 2,905 artillerymen converted into mounted infantry).

In this experiment of creating mounted infantry, all those drawbacks which had been learned for centuries were exemplified. As an improvisation, mounted infantry disturbs the cohesion of organizations; if permanently organized, it must become cavalry, just as the dragoons became cavalry: for mounted infantry is neither flesh, fish, nor fowl and can not endure. (See pp. 18 and 87, *supra*).

The English Drill Regulations (1904) for mounted infantry lay down the following principles for its employment:

In the practical employment of mounted infantry, sight must not be lost of the fact that this arm is drilled and trained as infantry. On account of its greater mobility, it should be able to cover greater distances, and, in addition, be capable of executing wider turning movements than infantry. As a rule, mounted infantry is to be used in the following cases:

(a) It is to perform the service of security in the immediate front of infantry divisions, in conjunction with cavalry and the horse batteries assigned to the latter, in addition to augmenting the fire of the cavalry. It is, further, to occupy, as expeditiously as possible, tactically important positions. It is to find positions from which it can bring fire, preferably flanking fire, to bear on the flanks of hostile cavalry before the actual combat begins. It is to improve every success gained and constitute a formed nucleus in case of a retreat. Moreover, mounted infantry should enable the cavalry divisions, far in advance of the army, to devote themselves exclusively to the strategical reconnaissance with which they are charged.

(b) In addition, the mounted infantry is to constitute a light mobile reserve which the commander-in-chief can despatch at a moment's notice from one wing to the other for the purpose of lending assistance, or for influencing the action at particular points and for which other troops are not available on account of the extraordinary extension of modern lines of battle.

(c) Finally, mounted infantry is to fill the rôle of a mobile column in minor warfare or in expeditions in colonial wars, and in performing this duty assume the functions of the absent cavalry in the service of reconnaissance and patrolling.

The following is the organization and strength of mounted infantry organizations:

In war every infantry battalion is to furnish one company of mounted infantry, consisting of 5 officers, 138 men, and 144 horses; and every brigade (4 battalions) one battalion of four companies. To each battalion of mounted infantry is assigned: one machine gun platoon, con-

sisting of two guns and two ammunition carts (2 officers, 40 men, and 54 horses). Hence, the aggregate strength of a battalion of mounted infantry is, 28 officers, 630 men, and 676 horses.

The creation of mounted infantry is proper only where climatic conditions make long marches by European troops impossible, or in cases where the arrival of a few soldiers at distant points will exert a potent influence on the actions of an opponent. As shown by our experience in Southwest Africa, the proper field for mounted infantry is colonial (guerilla) warfare, especially when it is important to prevent the outbreak of threatened disorders and to let the country return quickly to a state of peace upon completion of the principal actions. On European theaters of war, space is lacking for the employment of mounted infantry and, moreover, there are not enough horses.

During the Boer war, a mixed division was formed and placed under command of Sir Ian Hamilton. This division consisted of the following:

2 infantry brigades (each of 4 battalions and 1 battery) a field hospital and ambulance companies;

1 cavalry brigade of 3 regiments and 1 horse battery;

1 brigade of mounted infantry of 4 detachments (each having 1 pompom gun) and 1 battery;

Divisional troops: Rimington's Guides (doing duty as messengers); 2 batteries;

1 platoon of 12.5 cm. guns.

The effective strength of this division was 11,000 men, 4,600 horses, 8,000 mules, 36 field guns, 2 12.5 cm. guns, 6 pompom guns, and 23 machine guns.

The division left Bloemfontein on April 22d, 1900, covered a distance of 640 km. in 45 marching days, participated in 9 large and 18 minor engagements, and was able to march into Pretoria on June 5th.

## MACHINE GUNS.

The machine gun battery* combines high infantry fire power (approximately equivalent to that of the skirmishers of a German cavalry regiment, armed with car-

*See *Tactics*, I, KRUEGER'S translation p. 273, *et seq.*

bines, or to that of 4—6 platoons of infantry)* with instant readiness for firing, and a mobility which enables it to follow the mounted arms anywhere. Machine gun batteries accomplish the principal object that cavalry expects to attain by the assignment of infantry, viz., relief from fighting on foot, great fire power, and mobility. Even in reconnaissance duty, machine guns will be employed to break down the resistance of the enemy in occupied localities and to augment the resistance of their own force in such places. During an advance, machine guns should go into position at an early moment in order to cover as effectively as possible (preferably from a flank) the advance and the deployment for the mounted charge. It is advisable to post the guns of a machine gun battery together, so as not to have numerous lines of fire interfere with the movements of the cavalry; this is especially emphasized by the Austrian regulations. Machine gun batteries, like horse batteries (artillery), remain with the cavalry divisions during a battle. The chance of producing a sudden fire effect within a short space of time must be especially utilized. Special efforts should therefore be made to place entire machine gun batteries into action. The employment of single guns is precluded on account of the danger of breakdowns. The employment of platoons is especially proper in defense.

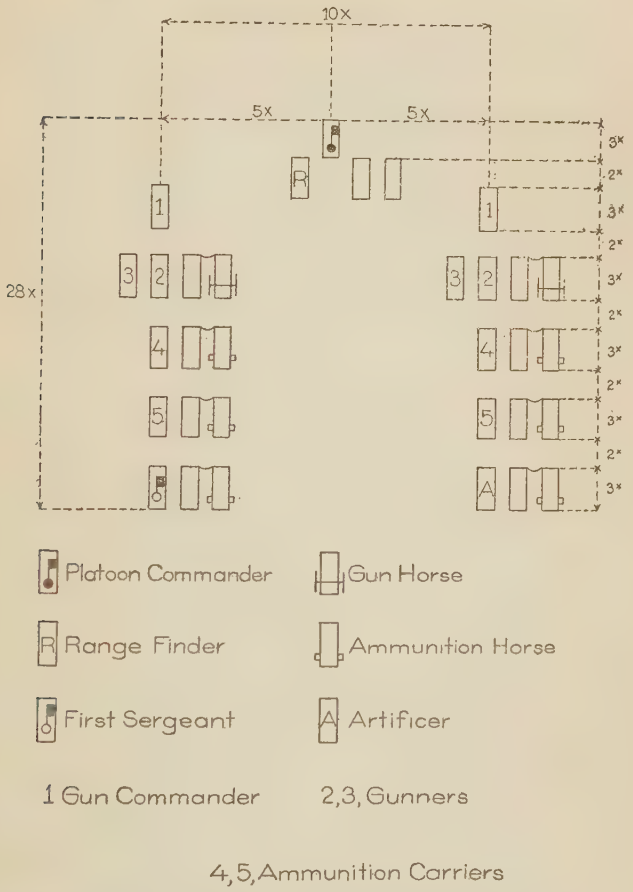
The duties of machine guns naturally grow out of their tactical advantages. Their fire power should be saved for tall targets that appear in decisive moments, in which a development of strong fire at short range is requisite.

*A German cavalry regiment at peace strength numbers from 552 to 576 sabers; a platoon of infantry, on a peace footing, numbers from 48 to 53 men.

In making a comparision between a cavalry regiment and a machine gun battery, it must be borne in mind that horse-holders are deducted from the strength given for a cavalry regiment.—*Translator.*

Machine guns can be transported upon larger vehicles capable of being unlimbered; they can also be carried on pack horses or other pack animals, and for short distances by men. Although pack animal transportation enables the guns to follow the troops anywhere, the amount of ammunition that can be carried along is limited, and the opening of

**A Platoon of the Austrian Machine Gun Battery.**




fire is retarded, since gun and tripod must first be assembled; the opening of fire may even be delayed when a pack animal falls; ammunition can not be carried on the gun; and the animals get sore backs even if pack saddles are carefully adjusted. It is difficult to distinguish advancing machine gun batteries equipped with pack animal transportation from cavalry.

Although the greatest readiness for firing was obtained with guns mounted on cavalry carriages (two-wheeled carts similar to limbers, and equipped with shafts), which also permitted the greatest amount of ammunition to be carried along, these guns offered such a high target that their use, in an infantry action, was entirely out of the question, leading only to their being quickly silenced. Another defect was that the guns were unable to follow immediately upon the heels of the organization to which they were attached.

In **Germany** a sled mount and transportation on a gun carriage is preferred. In all other states, preference is given to the tripod mount and pack animal transportation. The advantages of the tripod and the wheeled carriage have been skillfully combined in the carriage adopted in Germany. In this, the gun rests on a sled; this is in turn supported by the carriage proper, which is wheeled. This arrangement permits the gun to be fired quickly, directly from the wheeled carriage, or from the sled, which is detached from the carriage for that purpose. The sled permits the gun to be laid at any desired height and enables it to follow infantry anywhere during an action.

The following complement per gun is considered necessary:
Germany: 14½ men..... 9 horses;
Switzerland: 8½ men.....12 horses.

In the Russo-Japanese war, the machine gun detachments of the Russian cavalry were equipped with *Rexer* guns, which can scarcely be considered machine guns owing to their slow rate of fire and extreme heating of the barrel.

**Austria:** A cavalry machine gun battery—provided as a substitute for the Jäger battalion formerly attached to each cavalry division—consists of 4 machine guns transported on pack animals. The ammunition carried amounts to 15,000 rounds per gun (5,000 rounds on pack animals and 10,000 rounds on the ammunition wagon). A gun section (*Gewehr*) consists of one machine gun, 9 mounted men, and 4 pack animals, 3 of the latter carrying ammunition. Two guns form a platoon.

*Formations:* The order in line, the guns 10 paces apart; the combat order, the guns 25 paces apart; and the route column, the distance between horses being one pace. The road space of a machine gun battery is approximately 120 m.

*Kinds of fire:* Volley fire (*Salve*);* fire at will (*Einzelfeuer*),† and single shots.

Machine gun batteries are to relieve the cavalry of dismounted fighting, participate in mounted action, and reinforce reconnaissance escadrons.

**Switzerland:** See *Tactics*, I, KRUEGER'S translation, pp. 284 and 288.

*This corresponds to the German volley fire (*Reihenfeuer*).

†This corresponds to the German continuous fire (*Dauerfeuer*).

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## IV. CAVALRY VERSUS CAVALRY.

### 1. GENERAL.

Victory over the hostile cavalry is the prerequisite to any reconnaissance and to al further cavalry operations. What our cavalry obtained with ease during the Franco-German war can not be gained at present except by fighting. The cavalry must charge, unless it desires merely to threaten on the battlefield. It will find support in the fire of its artillery and machine guns and in that of dismounted units. By combining mounted and dismounted action, cavalry can operate independently in almost any situation, can delay hostile forces of all arms, and can inflict losses on them.

The special peculiarities of the cavalry combat arise from the nature, the virtues and the shortcomings of the horse. On account of its speed, its weight, and its highly excitable nature, the horse is especially suited for dashing at the enemy. On the other hand, it is not so well adapted to persevere inactive under hostile fire, and submits but unwillingly to firing from the saddle. By making a rapid dash, in a combat in which all the three arms are engaged, cavalry may, indeed, penetrate a hostile position, overrun parts of the same, and capture batteries, but it is incapable of maintaining, by means of an adequate defense, the advantages gained. When mounted, cavalry can penetrate the enemy's line only by utilizing its shock power—the shock itself, supplemented by the use of the *arme blanche*—and the mêlée. The impact with the hostile line is always preceded by a movement of variable length for developing full speed and for gaining a favorable shock direction. This movement is called *the advance to the attack.*

Only horses that are entirely fresh are capable of developing and maintaining full speed for a protracted period while carrying field kit. Hence, the necessity on the battlefield of keeping the cavalry fresh by assigning rest periods, and by feeding and watering. (Par. 401, German C. D. R.). General von Barby complains on August 16th, 1870, "that the horses were not in condition to charge with more speed." And yet the brigade had marched only 30 km., and then charged over a distance of 2,400 m.

Mass and velocity are the factors upon which success depends. The velocity can not be increased beyond a certain point and is, moreover, reduced by broken ground and by obstacles. "In an engagement of all arms, even small units may gain success, if they seize the right moment. A decisive interference in the course of a battle, whether this is accomplished by warding off the hostile attack, or by supporting one's own, is only possible by launching large masses of cavalry." (Par. 398, German C. D. R.). In Manchuria, the Russian commander-in-chief kept numerous bodies of cavalry in readiness, but these lacked the capacity of advancing unitedly, the determination of closing with the enemy. Cavalry is the very arm that is easily frittered away in petty missions. At the point where the commander wishes to use cavalry, he should gather together all that is available of that arm, place this cavalry mass under a single leader and exercise an influence over its operations by means of orders. Kuropatkin also gave his cavalry such orders, it is true, but they were qualified at the last moment. General v. Pelet-Narbonne* seeks to explain the inactivity of the cavalry on some days of battle, as follows:

"Charging cavalry is like a fired projectile, whose effect is incalculable and which may, in certain circumstances, rebound on the marksman. Many a cavalry officer, though personally brave, hesitates to come to such

*Militär-Wochenblatt, 1904, Supplement No. 12.

a decision (to charge), fraught as it is with consequences that are usually incalculable, and to demand from his troops great and perhaps useless sacrifices. Though it is feasible for the other arms to break off an action, it is not possible for cavalry so to break off a mounted charge. Events take their course. *In the cavalry, literally everything depends upon the initiative of the leader, hence the decisive importance of personality in that arm. Nothing is done without the leader's taking direct personal action.* On the other hand, it is easily conceivable, for example, that an infantry division in a rencontre might gain a victory solely through a natural development of events and the action of subordinates, without the division commander's having contributed in the slightest degree to the result. When cavalry units, whose leader is perhaps struggling hard to come to a decision, belong to a force commanded by an officer of another arm, the latter should, in a given case, shrink less from ordering a charge that is deemed necessary, than is, in general, the practice. The cavalry leader who is thereby relieved from responsibility would, perhaps, greet such an order with joy and execute it with skill and energy. In all probability, Bredow's famous charge at Vionville would never have been made without a specific order."*

## GROUND SCOUTING AND RECONNAISSANCE.†

Cavalry avoids terrain that prevents the horses from developing all the speed that is in them—such as rising slopes, marshy, soft or sandy ground—endeavors to obtain, by timely despatch of ground scouts, information of the passableness of the terrain in all directions, and looks for and marks crossings over obstacles. Seydlitz caused

*Nearly all the charges made by French cavalry during the Franco-German war, were made by orders of the commanders of units of which the cavalry formed a part.

†Pars. 47–49, *German C. D. R.*

The term *Erkundung* has been rendered by "ground scouting," the term *Aufklärung* by "reconnaissance."

the crossings over the Zabern bottoms at Zorndorf to be marked by wisps of straw.*

On forming, one non-commissioned officer and at least two privates are detailed as ground scouts in each escadron. These men gallop ahead charged with the duty of indicating obstacles by means of signals. To raise and hold the lance in a perpendicular position, signifies, "passable at this point;" to raise and hold it in a horizontal position, signifies, "not passable at this point." The distance at which ground scouts precede the escadron depends upon the terrain; but, in any event, ground scouts and escadron must keep each other in view. A ground scout remains behind at places suitable for passing obstacles until he is certain that the crossing point has been recognized. Ground scouts thus left behind then regain the requisite distance by taking up a faster gait. They must scout the ground in time to prevent their organization from encountering obstacles unexpectedly. It is a good plan for leaders of independent escadrons, and higher commanders, to have a few ground scouts ride with them.

Ground scouting begins at once upon arrival on the battlefield, and should be concluded long before the unit starts to charge. Measures for local reconnaissance are taken independently of ground scouting, but this does not mean that these two operations could be separated.

### Provisions of Various Regulations.

**France:** Each escadron is preceded at 200 m. by two ground scouts.

**Austria:** Each escadron is preceded at 300 m. by two ground scouts.

**Italy:** Each escadron is preceded by two ground scouts. The distance at which they precede the escadron is not stated.

**Russia:** Each escadron sends out eight ground scouts to a distance of 500—600 m. to the front, rear, and both flanks.

### Examples of Inadequate Ground Scouting.

**Ligny,** 1815. The charge made by the 6th Prussian Uhlans against French Guard infantry failed in a grain-field when a steep six foot declivity was reached.

**Königgrätz,** 1866. To cover the artillery of the VIth Army Corps at Nedelist (Königgrätz), the 4th Hussars received orders to charge

*Lieutenant-General Count v. BISMARK, *Die Königlich Preuszische Kavallerie unter Seydlitz* (Karlsruhe, 1837), p. 121.

an Austrian battery that, supported by cavalry, had gone into position at Lochnitz. In its desire to get at the enemy, the regiment neglected to send out ground scouts, and encountered, after it had taken up the gallop, a cut 6 m. in breadth and 3—4 m. in depth. Even had ground scouts been used, they could hardly have given timely warning of the presence of this obstacle, as it was located in a grain-field and in immediate vicinity of the hostile battery. Only a part of the men succeeded in stopping in time; most of them were precipitated into the cut. The commander of the Hussars desired to rally his badly dispersed regiment, but in this he was only partially successful, as the Hussars that had crossed the obstacle could return only by making a detour. The Austrian cavalry took advantage of this state of affairs to make an advance, which brought about a mêlée that resulted unfavorably to the Hussars.*

Three charges made against an Austrian battalion that was retiring from **Horenowes** failed likewise when an impassable cut was encountered. The battalion mentioned retired skillfully along one side of this cut.†

At **Wörth,** the ground over which the cavalry had to charge had not been reconnoitered.‡

But, since a successful charge extends far beyond the sphere of action of the ground scouts, cavalry that is in the act of pursuing, or that has just formed line before the impact, may encounter obstacles that the troopers can not surmount. (Example: The stone quarries of Floing on the battlefield of Sedan).¶ Whether an obstacle is formidable depends upon the training and condition of the cavalry. A ditch may be an obstacle for tired, wornout cavalry that is not trained to jump in close order, whereas it is taken easily by cavalry that is better mounted.

At **Trautenau,** in 1866, Austrian Windischgrätz Dragoons overestimated the formidableness of an obstacle in their front. This obstacle consisted of a ditch with a dike one meter in height and was taken by Lithuanian Dragoons during their charge, only eleven men of their 1st escadron being thrown in jumping the ditch.§

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**Geschichte des 4. Husarenregiments*, p. 128. *Gen. St. W.*, 1866, p. 389.

†BESSER, *Preuszische Kavallerie*, p. 108.

‡BALCK-KUNZ, *Wörth* pp. 132 and 198.

¶See likewise, charge made by the Daghestan Cossack Regiment in the Russo-Japanese war, p. 94 *supra.*

§See the vivid account of this charge in *Erlebnisse des Lithauischen Dragonerregiments Nr. 1 im Feldzuge gegen Österreich.* Berlin, 1869.

The combat reconnaissance in front and on the flanks should be continued until the various combat patrols encounter resistance that they can not overcome; an inferior opponent should be thrown back: whereas contact should be maintained with a stronger one. Measures should likewise be taken to ensure reconnaissance in case a victory is not gained. (Par. 133, German F. S. R.).* But the reconnaissance has a limit if superior hostile cavalry is present. The latter must therefore be driven off the field or turned.

## 2. THE ADVANCE TO THE ATTACK.†

To enable it to count with certainty on the coöperation of all its parts, cavalry when opposed by stronger cavalry that has not as yet been definitely defeated, will march in a single column. Cavalry that arrives upon the battlefield with its integral parts scattered, will seek to concentrate them either by avoiding an encounter or by occupying and holding suitable points. (Par. 413, German C. D. R.). A cavalry unit marching in a single column will remain in route formation on the roads as long as possible in order to save the troops. A more suitable formation -one that permits, finally, a united launching of the entire body—is not taken up until the patrols have ascertained the presence of the enemy. The necessity for extended reconnaissance is obvious. It is by such reconnaissance alone that the cavalry can avoid the dangers incident to being surprised by hostile fire, or can prevent being forced to fight on unfavorable ground.

So long as the various elements of the division march in rear of one another, the rear units take up, without further orders, the formation and gait of the leading unit. The importance of keeping the movement going uninter-

*Combat patrols, pars. 50, 388, 409, 410 and 411, *German C. D. R.*

†Pars. 412—416, *German C. D. R.*

ruptedly by means of an even cadence, or by other suitable measures, increases with the depth of the division. Elongation of the column, as well as closing up to make up distances lost, should be avoided.

An assembly formation is taken up (preparatory to combat) in exceptional cases only. A number of groups is formed instead, as a rule, and a greater front thus covered. This is to facilitate the subsequent deployment forward, or to expedite, if necessary, the entry into action, the leading element being halted and the deployment being made by the flank (pars. 141, 142, 332 and 434, German C. D. R.), or to make the advance conform to the conduct of a base unit (pars. 175 and 224, German C. D. R.). It necessitates that the depth of the column be reduced and that the combat train be cut out of the column.

A cavalry brigade in route column takes up a road space of 1,070 m. At the trot, the transition to column of platoons, which has a depth of 440 m., takes four and one-half minutes, and to double column, which has a depth of 220 m., seven minutes. In a cavalry division in which two brigades march in rear of the artillery, it takes from sixteen to twenty minutes at the trot, for these brigades to form double column and to arrive abreast of the leading brigades.

On leaving the road* (pars. 414 and 217-219, German C. D. R.), the advance guard, the artillery and the machine guns are assigned their several tasks, *in orders for the development for action*, or are attached to some brigade. The brigade upon which the development is to be made is then designated as the base, an objective upon which the march is to be directed being at the same time indicated. In this the brigades may be posted either abreast or in

*Explanation of certain German terms: The *Aufmarsch* (concentration) of the infantry (par. 315, Part II, German I. D. R.) corresponds to the *engen Versammlung* (mass) of the cavalry. In the cavalry, the term *Aufmarsch* (front into line) denotes transition to line. The meaning of the term *Entfaltung* (development for action) is the same in all arms. In the infantry, the *Entwicklung* (deployment) consists of forming the troops for battle and includes the extension into line of skirmishers; whereas, in the cavalry, it consists of forming line of escadrons in columns of platoons.

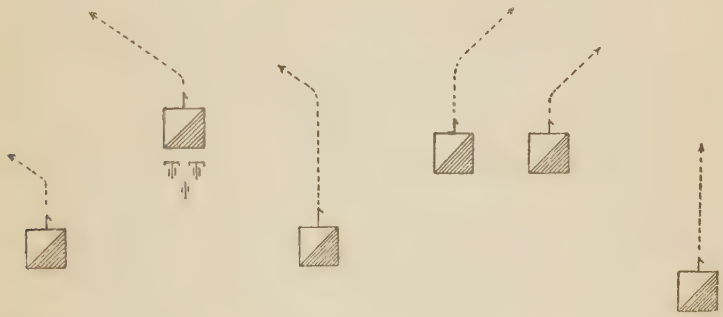
See *Tactics*, I, KRUEGER'S translation, p. 205 *et seq.*, and *ibid.*, II, KRUEGER'S translation, p. 62.

echelon. Intervals and distances are regulated in orders. The combat train is cut out (par. 441, German F. S. R.), and a dressing station (par. 481, German F. S. R.) established. Pioneers may be utilized either to assist with their rifles in defense or to execute technical work.

It is desirable to come down to the walk, even if only for a short time, so as to enable the rear units to come up. The carbines are slung. In order to utilize the terrain to the best advantage, to minimize the effect of the enemy's fire, and to increase one's own readiness for action, the brigades take up a broad formation of little depth, frequently the double column of platoons or the double column. Orders for protecting the flanks should never be awaited. The commander of each flank unit of his own accord sends combat patrols toward the flank. (Par. 50, German C. D. R.).

The subsequent advance is made from point to point, the artillery being brought up from one position in readiness to another. Cavalry combats resemble *rencontres;* the commander who strikes first secures freedom of action for himself and has a chance to dictate a course of action to the enemy. In the cavalry, moreover, it is more difficult than in the infantry, to overcome the start gained by the enemy in deploying. On encountering the enemy, the leader must decide whether he should make the most of such a start (pars. 407, 408, 409, 422 and 434, German C. D. R.), or whether he should place greater reliance on launching his whole force in one body. In many cases, particularly in the service of reconnaissance, success gained at an early moment, is of special importance. On the other hand, retained portions of the command should not be so far in rear that the attacking line can be thrown back before these supports can take a hand in the fight. If the situation is not as yet cleared up, the advance is made with corresponding caution and it becomes necessary to keep certain parts of the command in reserve so as to

enable the force to deploy not only to the front but in some other direction as well. Placing supports on both flanks appears to be the simplest method of accomplishing this. This formation permits line to be formed quickly in any direction by each element partially changing direction. When one flank can be so posted as to rest on impassable



ground, or on terrain that is open to view for a long distance but commanded by one's own artillery, one will provide echelons on one flank only.

An attack formation having an advanced echelon may be the natural result of the advance guard relation and arises primarily from a desire to assume the offensive. Such an echelon may be able to induce an imprudent enemy to make a charge against which the other echelons then turn. Placing echelons in advance in this manner best accords with the offensive, but counts upon a definite line of conduct on the part of the enemy. If conditions on the enemy's side can be ascertained with reasonable accuracy, the cavalry leader will be able to develop his forces from the very outset abreast of each other and on as wide a front as has been determined upon beforehand for the attack. The start gained hereby, coupled with rapidity, will frequently make it possible to attack the enemy so as to envelop him while he is still in the act of deploying. The brigade commanders in the various eche-

lons take measures, on their own initiative, for the proper distribution in depth of their respective brigades and for protection of the flanks. The division commander may either order directly what reconnaissance is to be made, or assign definite combat fronts to his brigades.

The flexibility of the echelon formation enables the cavalry commander, as the clearness of the situation grows apace, to gain that grouping of his force from which as a basis the attack is to be made. But the leader must guard against the danger of beginning the action with inadequate forces and then launching them in driblets. This would give the enemy the best of it in the first encounter and it is doubtful whether the advantage thus gained could ever be wrested away from him.

As soon as the division commander has decided to attack, tasks are first of all assigned to machine guns and artillery. If these arms are to do efficient work, they must go into position promptly. Their position must lie within effective range of the point where the encounter will, in all probability, take place. In case both combatants are actuated by this intention, the horse batteries of friend and foe may finally oppose each other at close range.*

The brigades then receive their orders for attack, provided an objective can be assigned to each; otherwise the march direction is indicated to the base brigade and a part of the force is detailed as a reserve. Everything else is the business of the brigade commanders (direction of the charge, base regiments or objectives).

*There is not much time available. If the two opposing cavalry forces are 4,000 m. apart when the order for attack is issued, only seven to eight minutes remain before the collision.

## 3. THE CONDUCT OF THE CHARGE.

The charge will have the best chance of success against cavalry that is ready for action, if the charging force is properly formed, maintains the trot as long as possible and, after covering a short distance at the gallop, endeavors with a powerful shock to ride down the enemy.*

The speed at the moment of impact depends upon the capacity of the slowest horses. Hence the shock can be delivered in two clearly defined closed ranks, in which each individual trooper maintains his place with the firm resolution of riding and thrusting down the opponent.

If, on the other hand, an opportunity offers to strike the enemy while his deployment is still in progress, advantage should be taken of this weakness by charging him, even without awaiting the completion of one's own deployment, with such parts of the force as are ready for action. Success will then depend upon quickly covering the distance to the enemy (fast gallop). An arbitrary assignment of gaits to be used at the various stages of the charge is out of place; the terrain, the character of the ground, the degree of the enemy's preparedness for action, and the condition of the horses will be the governing factors. It should be borne in mind that if the attack is begun from

*General Stuart's method of attack: Advance to the attack at a walk; when 200 paces from the enemy, well collected trot; at 50 paces gallop progressively increased. It should be borne in mind that the opposing cavalry had a *penchant* for awaiting the charge and receiving it with fire.

The views anent the use of short gaits in a charge, though they have nothing but an historical interest, are here quoted: Jomini writes: "The fast trot seems to me to be the best gait for charges in line, because here everything depends upon the combination of boldness and order, conditions that are not found in charges made at a fast gallop . . . Some experienced officers prefer the canter begun when 200 paces from the enemy. I know that many troopers think likewise. But I also know that the most distinguished generals of that arm incline toward charges at the trot. La Salle, one of the most skillful of our generals, said one day upon seeing the hostile cavalry at the gallop, 'those men are lost'." In his report of the engagement at Zehdenik on October 26th, 1806, La Salle boasts of not having given the signal to charge until his brigade was within ten paces of the hostile line. This is in line with the inclination of the cavalry of the First Empire to await a charge and to receive it with carbine fire.

a halt and line is formed just prior to the moment of impact, the charge can never gain the momentum that it could have attained if a longer distance had been covered at an easy gallop, straight to the front, without urging the horses. When charging an opponent who is already formed, one will have to count on covering 400 to 800 m. at a gallop and 50 to 100 m. at top speed.

The cavalry combat is not preceded by preparatory stages, but enters at once upon the decisive act, which is over in a very few minutes. Favorable moments, moreover, are fleeting. For these reasons, the very nature of the cavalry combat requires that as large a force as possible be simultaneously launched at the decisive point. "For, if this first attack is repulsed, a second or a third will succeed in the rarest cases only. The first line will then form, in the mêlée as well as in the retreat, an obstacle through which the second line could not possibly advance in good order. The direct support from the rear is, at best, but a numerical reinforcement, which can become effective only in a protracted and, for that reason, rare mêlée." (Fieldmarshal Moltke).

As soon as the attacking force moves against the enemy, it forms line of escadrons in columns of platoons. Line is formed as soon as the proper direction for the charge has been gained. If one forms line prematurely, one sacrifices some mobility, betrays one's intentions to the enemy, and gives up all hope of subsequently using advantages offered by the terrain. A tardy deployment entails the danger of one's being surprised. Every unit that is launched in a charge must ride down the opponent indicated to it, without regard to what happens on either side. This, and this alone, assures that the enemy will be actually struck at the first impact, by as many regiments and escadrons as the commander deemed necessary to launch. In each regiment, the escadrons, each well closed, must be so led as to assure a united attack. The attack-

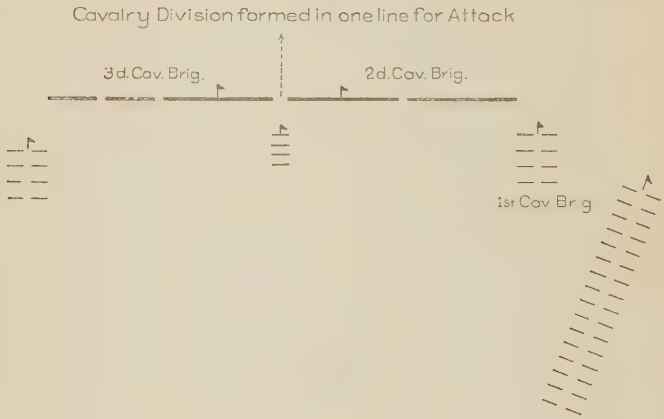
ing line may be preceded or followed by supporting echelons consisting of single escadrons, but it is followed only in exceptional cases by an escadron as a second line.

### DISTRIBUTION IN DEPTH; SUPPORTS; LINE.

To assure, by protecting the flanks in the first place, the success of an attack made by a considerable number of escadrons, to make flank attacks, to pursue the enemy, and to cover the rally, requires distribution in depth. Whereas an escadron is launched, as a rule, in a single line, a regiment finds it necessary to guard the flanks, and a brigade to provide a reserve. Infantry begins an action with a comparatively weak fraction of its force, and gradually strengthens the firing line by pushing in retained units. In the cavalry, on the other hand, when advancing to attack cavalry, the retained fractions have subsidiary tasks. Whereas cavalry finds itself at once in a combat situation, ripe in every respect and requiring instant decision, in the infantry everything is, for the time being, still in the process of developing, and the decision can not be brought about except by means of a prolonged fire fight. The reserves of the infantry are posted in rear of the units that they are to reinforce, the distances being such that the reserves are as much as possible sheltered from hostile fire. Thus the infantry combat leads ultimately to an admixture of all units. In the cavalry, the retained units can not be directly pushed into the attacking line, but must be placed on either or both flanks of that line. This then governs the location of such retained fractions a short distance in rear of one or both flanks of the attacking line, or in prolongation of that line and separated from it by an interval. To place retained units directly in rear of the attacking line would expose them, in case of a repulse, to the danger of being run down and carried away by that line. Except in an attack against infantry or artillery, in which the cavalry must break up and multiply, in

the direction of depth, the number of targets it offers, the various cavalry units are posted abreast, i. e., by wings, so-called.

This has the advantage that tactical organizations are not broken up and that the force, split up into brigades and into regiments can pick out suitable positions. Be-




sides, it enables the leader to dispose with greater facility of the several fractions, and makes it possible to keep the enemy in the dark until the very last moment in regard to the true attack direction. Moreover, the leader of every subdivision can form his own reserve, all reinforcing is done from the rear by troops of the same organization as the attacking line, and rallying after a charge is considerably facilitated. In addition, greater freedom is offered to the initiative of subordinate leaders, in contrast to the former combat formation in successive lines, which excluded rather than required initiative. But now as in the past, the prerequisite to success is the determination on the part of every leader to be on hand at the decisive moment.

The Germans call lines that follow in the trace of the attacking line, "*Treffen.*" As the lines in rear, owing to

the cohesion of the first line, can find employment in a charge against cavalry only when hostile troops pierce the attacking line (task of the so-called supporting escadrons), or when there are gaps in that line, it follows that a formation in successive lines, as mentioned above, is permissible only in a charge against infantry or artillery. Units that are not employed in the first line may be posted either in rear of the flanks as "defensive wings," or in front of the flanks as advance echelons. Whereas a supporting escadron is employed directly to the front only, an echelon of the line that has been pierced can make a flank attack, can prolong a line, and can execute an envelopment or repulse such a movement if made by the enemy.

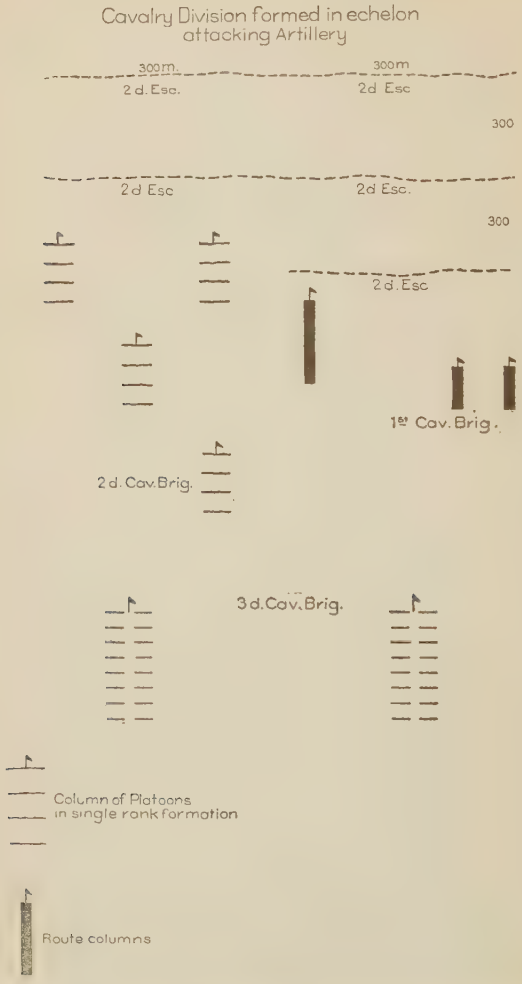
Whether so-called "supporting escadrons" are to be condemned on general principles, can only be determined by experience gained in war. Such escadrons are to be used against hostile troops that have broken through the first line. The danger of their being carried away by a retreating first line must be reckoned with. Another drawback is that a regimental commander employing a supporting escadron, voluntarily deprives himself of one-fourth of his regiment, which might have been used to better advantage on a flank. Whether supporting escadrons should be used will therefore have to be decided in each individual case. Their employment may be proper in case the march directions assigned to the various fractions during an attack do not guarantee cohesion at the moment of impact.*

*Par. 170, *German C. D. R.* (Regiment): "An escadron will follow as a second line in exceptional cases only." Par. 200, *German C. D. R.* (Brigade): "Under certain conditions single escadrons in line may follow the attacking line."

During the charge against Montaigu's Cavalry Brigade (French), the 2d Hussar Regiment, (No. 10)—distributed by platoons in rear of the 13th Dragoons—fell upon the French Hussars that had broken through the German lines. Cavalry action at Ville sur Yron.—Conduct of the 5th Cavalry Division. *Supplement to Militär-Wochenblatt*, 1892, p. 311.

Supporting escadrons are the remains of the Great Frederick's second line, whose strength visibly decreased as the superiority over the hostile cavalry increased.

In a memorial written in 1872, General Count Stolberg suggested that cavalry divisions be formed and used in three lines.* Count Stol-




berg advocated the use of successive lines as such, in rear of one another, in attacks on infantry and artillery only, such use to be confined to the two leading lines. In all other cases, lines in rear were to be used abreast

*v. KAEHLER, *Die preuszische Reiterei von 1806 bis 1876*, p. 258.

of the leading line. The revivers of the tactics of successive lines were therefore fully aware of the fact that their lines were by no means at all times to appear in that relation. General von Schmidt, who had earned great distinction in developing the regulations governing the employment of cavalry in combat, recognized the advantages of this formation. Through his efforts the following normal attack formation for the division was adopted: one brigade as the first line, followed directly at 150 paces by two supporting escadrons furnished by another brigade, the remainder of this brigade following 150 paces farther in rear as a second line and overlapping the first line on the exposed flank; the third brigade was posted on the opposite flank and 150 paces in rear of the second line. Definitely prescribed formations for going into action facilitate deployment and simplify command, but, it should not be forgotten that, on the other hand, they tend to produce a rigid "pattern" conduct. The system of three line tactics facilitated the united launching, in one body, of all of the escadrons. Furthermore, in it, the division constituted a single unit of command, each and every subdivision having its own well defined task, closely coördinated with that of the whole division. These advantages led all armies to incorporate the system of three line tactics into their regulations. After this tactical system had proven successful on the maneuver ground, people sought to find points of similarity between the modern employment of cavalry and that of Frederick the Great. In this comparison, however, the very important difference was overlooked, that in the Great Frederick's cavalry the first and second lines were launched as one unit, whereas in three line tactics the first line usually made the frontal attack, the second line the flank attack. Under Frederick the Great, the third line was not placed under the orders of the cavalry commander, but constituted an independent army reserve. Nowadays, we form such an army reserve of all three arms, whereas the third line in the cavalry division constitutes the reserve of the cavalry leader.

Frederick's cavalry was formed in two closely united lines when attacking cavalry. The first was to throw back the enemy. For this purpose, it was to be made as strong as the length of the hostile line necessitated and the terrain permitted. The first line was to ride straight at the enemy and to maintain such good cohesion as to enable it to ride down anything opposed to it. If practicable, it was to outflank the enemy, and to turn with its flanking groups at once against the hostile reserves. A second line, usually weaker than the first, was to follow a considerable distance in rear of that line as a reserve and to overlap it with some escadrons so as to protect the flanks. The second line was charged with the task of ensuring success when, perchance, the impact of the first line had failed to bring about a victory. It was, furthermore, charged with immediately protecting the flanks of the first line, in order to prevent that line from being misled by possible hostile flank attacks and enticed into maneuvering. Part of a number of escadrons of Hussars, in column, accompanied the wing that was in the air, and others followed

in rear of the two leading lines as a third line. These Hussars were not under the orders of the cavalry commander, but entirely independent. It was their duty to oppose the more extensive flank or turning movements that might be made by the enemy, particularly by mobile hostile Hussars, or, when circumstances permitted, to move on their own account against the enemy's flanks and rear.*

Whereas the French, until the appearance of the drill regulations of May 12th, 1899, preferred three equally strong lines, the Germans increased the strength of the first line to three and four regiments and divided the other regiments between the second and third lines.

In France, General Gallifet did not believe in this decisive success of the first line. He was of the opinion that even weak reserves might turn the scale in a cavalry fight. He argued that long lines would have to deploy at an early moment, frequently before accurate information was available as to the direction in which the enemy was to be found. Moreover, that, once deployed, they could no longer be controlled and would run danger, in case the first direction taken was inaccurate, of missing the enemy. Furthermore, that they did not even have the moral element to assist them, for each unit could see only those immediately in its front. In his opinion, long lines are, on the contrary, adapted to enhance the morale of the enemy, as they are easily thrown into confusion. Gallifet recommended that, when opposed by the strong German first line, the French cavalry keep well concentrated and pierce that line. This was based on the assumption that a German cavalry division would hurl itself like an enraged animal at the enemy, and it was sought to meet this alleged thoughtless, unwieldy onslaught by maneuvering and by a skillful use of *echelons* (groups). The French, therefore, condemn "three line tactics" and recommend that suitable dispositions be made to fit each particular case.

To launch a cavalry division according to the principles of three line tactics, each line having an accurately defined task, requires that the division be concentrated. The moment a part of the division is missing, or when the division is not concentrated or other troops join it, this tactical procedure undergoes a decided change. Furthermore, three line tactics are adapted only to open terrain permitting an unobstructed view, presuppose that the leader will be able to see the enemy as well as his own troops, and reckon with the fact that the flanks will be in in the air. Other drawbacks are the disruption of units of command, caused by splitting up the brigades, and

*Militär-Wochenblatt, 1904, No. 1. *Die Treffen in der Kavallerie-taktik.*

the set scheme of employment produced. Three line tactics correspond, in a certain sense, to the fiercely assailed normal attack of the infantry. Three line tactics, like the normal attack of the infantry find less and less application, as the deployment takes place more and more frequently from route column and not from an assembly or transitory formation. When hostile fire forces the division to break up into brigades, when the brigades arrive upon the battlefield, separated from each other, or when single divisional cavalry regiments or cavalry brigades, or entire divisions, join the attack, a so-called employment "by wings" (disposition of the several units of command) naturally results. The division commander is then replaced by independent brigade commanders, who relieve him of issuing detailed orders. (Employment of the Prussian cavalry on the plateau of Ville sur Yron, on August 16th, 1870, and the charge made by Pulz' and Bujanovicz' Cavalry Brigades at Custozza.)* Owing to the rapid course of the cavalry combat, the difficulty of leading consists of bringing the various units into action at the proper time and place. When orders do not arrive, it must be left to the initiative of each individual leader to take proper action.

## THE FLANK ATTACK.†

"Numbers alone are not decisive; mobility and skilled leadership may double the power. It is the duty of the leader to launch the decisive blow at the correct place and at the proper time. A great stride toward victory will have been made if one succeeds in dictating the enemy's course of action and imposing upon him the disadvantages of the defensive." (Par. 422, German C. D. R.).

*The term "employment by wings" (*flügelweise Verwendung*) is not quite accurate, for in three line tactics the several parts of the force may likewise be employed abreast of one another. The Austrian term "formation in groups" (*gruppenweise Gliederung*) is better, and the term "combat with units of command" (*Kampf mit Kommandoeinheiten*) better still.

†Pars. 394 and 428, *German C. D. R.*

In a purely frontal encounter, the number of troopers launched and the skillful use of the saber alone decide. Units that have no enemy in front of them will wheel into line and will seek to envelop a hostile flank. A blow directed at the opponent's flank does not produce an immediate offensive counter-movement. The part of the enemy's line that is threatened must first turn to face the attacking line and may be ridden down by the latter during this movement or thrown back upon that part of the hostile force which is still faced to the front. A line of cavalry advancing to the attack will rarely be able by itself to ward off a flank attack. This it must leave to units following in rear. Poor cavalry will be tempted to turn tail before the shock takes place. Although this effect of the flank attack may perhaps be confined at the outset to the flank units, it may be communicated finally to the entire line. "Three men in (the enemy's) rear do more than fifty in front." (Frederick the Great). Front and flank attacks should, therefore, be combined. The effect of the flank attack is increased if it is converted into an envelopment during the mêlée. From this we may deduce the following:

1. In a combat against cavalry, the flank attack is the most decisive form of attack. Its effect is increased in proportion to the suddenness with which it is made. "If the flank attack is made only against the flank of the leading hostile line, it will, to be sure, produce an effect through the shock and the attendant moral impression, but promises only a local success. Such an attack offers single escadrons a favorable target. If the attack is directed against the flank of the entire hostile force, in a broader sense, it will compel the enemy to change formation at a critical moment and may, when combined with a frontal attack, through envelopment, bring about a decisive victory. A simultaneous attack of both flanks presupposes

a considerable superiority or an opponent who has not as yet deployed." (Par. 428, German C. D. R.).

The bulk of the force is launched where it is desired to bring about the decision. Owing to its importance, the flank attack is frequently employed to bring about the decision. In such a case, only as many troops as are necessary to hold him are launched against the enemy's front.

2. The deployment in the direction of the point of impact should not be made prematurely, in order that the opponent may be left in the dark as long as possible in regard to the direction from which the shock is coming. On the other hand, it should not be made too late, so that there will be enough time to bring every weapon into line and give the horses a chance to get up all the speed that is in them. As soon as the proper direction for the charge has been gained and maneuvering is no longer possible, line is formed. The idea of gaining the enemy's flank by maneuvering is as tempting as the danger of being attacked in turn during the movement is great. Labored artifices are out of place in face of the enemy. Only by going straight at him can one dictate the enemy's course of action and prevent him from maneuvering and from making flanking movements. "The King hereby forbids all officers of cavalry, under pain of being cashiered in disgrace, ever to allow themselves in any action to be charged by the enemy, for the Prussians themselves are always to charge the enemy."*

3. The enemy is to be held in front and, when practicable, to be induced to deploy in a wrong direction.

4. The unit in the first line must be completely relieved of all care for its flanks and rear by units that follow in rear (echeloning), by the terrain, or by dismounted

*FREDERICK the GREAT, *Disposition wie sich die Officiers von der Kav. u. s. w. vom 25. Juli, 1744.*

The requirement "always charge the enemy first," is found as far back as 1727 in the Cavalry Drill Regulations of Frederick William I.

troopers or machine guns posted in suitable positions. (Pars. 432, 435 and 438, German C. D. R.).

5. The flanks should be constantly observed by combat patrols, who likewise continue in observation during the charge. (Pars. 50, 410 and 411, German C. D. R.).

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The difficulty of execution lies in striking the flank of the hostile cavalry, owing to the inconsiderable target offered by the same. Hence the charge should be launched in the direction of a point toward which both forces are moving. But a skillful opponent will have means of minimizing the effect of the flank attack. If a flank attack fails, the attacking cavalry may easily be dispersed or the flanking group may be thrown upon the frontal group.

A flank attack is either the immediate consequence of the direction of march of the force, or may be brought about, if the terrain is favorable, by forces retained in rear. It may be made with the entire force or may be intended to support an attack made from another direction. In order to keep the enemy in the dark as long as possible about the direction of the attack and to reduce the distances that have to be covered, it may sometimes be advisable to make the flank attack with the leading line.

It is important to decide how many troops are to be employed to deliver the blow at the enemy's flank. One must decide whether the flank attack should be directed against a hostile line that has already been launched, or whether an enveloping movement of greater magnitude should be made, so that not only the first but a second line as well may be struck. In the first case, only a few escadrons need be employed, as there are not enough objectives (flank of the first line) to make a broader frontage worth while. When the center of the flank attack strikes the flank of the deployed opponent, there must be a

sufficient excess of force remaining to wheel against his flank and rear. In any case, however, too many escadrons should not be employed, as a large part of the force might strike nothing. A few escadrons will suffice in most cases; the others remain available to guard the leading element and the exposed flank, and, as a reserve, to ward off hostile counter-attacks. It is idle to ask whether the flank attack should be made simultaneously with the frontal attack, or later; the main thing is that the blow be effective. A flank attack made subsequent to the collision may turn the scale in a mêlée that is a stand-off.

When initiating a flank attack, it is advisable to form double column, to have the head of the column execute an appropriate change of direction and to lead it against the enemy's flank. The force must be in a formation that enables it to deploy with equal ease in direction of the leading element and toward the front.

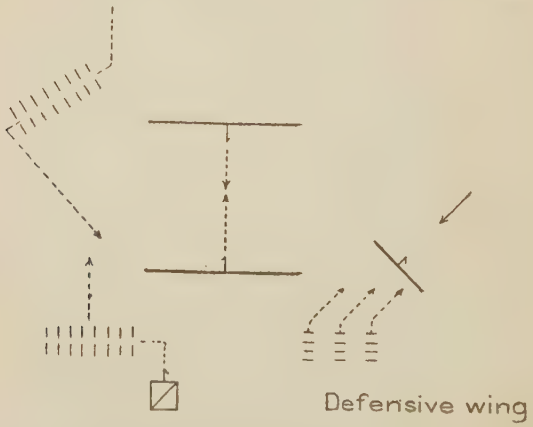
The column of platoons is weak in direction of its head, but strong toward a flank. At any rate, its head requires to be specially protected by a unit posted at the required deploying distance from the column. After the column of platoons has wheeled into line, this unit follows in rear of the exposed flank.

When the second echelon is already in line of escadrons, the heads of escadrons may be caused to change direction at the signal "heads of escadrons" (*Eskadronteten-Ruf*) and led, in this manner, against the enemy's flank. From this formation, it is equally easy to deploy against the flank of the enemy and against an attack coming from a direction opposite to the direction of march. This formation requires, however, open terrain permitting easy passage on a sufficiently wide front.

According to the very thorough Russian regulations, the second echelon, if already in line and if opposed on open terrain by a very mobile and wide-awake enemy, is to wheel by platoons, half right, for example, move toward the enemy's flank, make a quarter left wheel by platoons, execute front into line in each escadron, and charge. The Russians claim that this procedure has the advantage that the enemy

does not recognize the purpose of this movement until a very late moment and that the direction in which the charge is to be made is retained during the forward movement, making it possible to ward off a counter-attack on the part of the enemy. When covered approach is practicable, when the enemy lacks enterprise, and has no reserves in rear of his wings, the cavalry is to be led in column of platoons toward the hostile flank. When the second echelon is a considerable distance in rear of the first, it is sufficient to advance in echelon from one wing, and to wheel into line toward the hostile flank.

Protection for the flanks (warding off of a flank attack, pars. 436 and 437, German C. D. R.) is provided by forming a defensive wing, so-called, which moves straight toward the flank attack. In this operation the opponent has the initiative and may, if the attack is successful, throw the defensive wing upon the first line. The defensive wing is nothing but a makeshift in case one is surprised by a flank movement and time is lacking to take more adequate counter-measures. It is better to post troops in prolongation of the general line and to fall upon the leading elements of the enemy, or to envelop his main force. Such a maneuver is in line with the spirit of the offensive. The initiative, which the enemy seeks to gain, is wrested from him. If he wishes to avoid being himself




Warding off a Flank Attack
by means of offensive action.

taken in flank, he will have to change his formation as soon as he becomes aware of our advance. If he discovers our movement too late, he will not have enough time left to form a new front on his leading element and will go down to defeat. When the echelon is very strong, a combination of both methods will usually force the enemy to abstain from his intention.

## 4. THE IMPACT AND THE MÊLÉE.

Even when the terrain offers no difficulties, and hostile bullets produce no losses in its ranks, charging cavalry—in actual war—never forms such a solid wall that it could not be broken by the onrushing lines of the opponent. Besides, a line of charging cavalry is never straight enough to bear comparison with a stone wall. The desire to close with the enemy—a desire that does not appear equally strong in all the men—and losses will impair the cohesion of the line. The best men will seek to join their officers riding in front. Thus wedges are formed, which are driven against the enemy's line.* There is no collision of two solid bodies. A horse will invariably try to evade an obstacle, and the better the cohesion of the unit advancing to the charge, the smaller is the chance of such evasion. Consequently, the denser wedges will turn instinctively against those parts of the hostile line where cohesion has been lost, and will penetrate them. The inrushing troops will then carry away with them the adjacent parts of the enemy's line. The broken part of the line then either begins the mêlée, in which it will soon succumb

*The formation of the Hanoverian cavalry was actually calculated to produce this, for the best and strongest troopers on the best and strongest horses were posted in the center of the escadron and were to form a wedge in rear of the escadron commander.

Example: The successful charge made near Stresetitz by two escadrons of the 11th Austrian Uhlans against the 1st Dragoons of the Prussian Guard, whose cohesion had been considerably impaired by crossing a ditch.—*Kavalleristische Monatshefte*, 1908.

on account of its numerical inferiority, or, in view of that inevitable outcome, evacuates the battlefield, carrying with it, if the morale of the force is not good, parts of the line still intact. Both opponents may have their line penetrated. Both will likewise lose a number of troopers who, believing the turn taken by affairs in their front to be unfavorable to hand-to-hand combat, leave the field voluntarily or are soon forced to do so. The number of men thus withdrawing from the mêlée grows apace as the cohesion with which the line advances to the charge decreases, as the number of points of penetration offered the enemy increases, and as the ease with which the men can turn tail is enhanced. On the other hand, the number of men so shirking the fight, increases in proportion as the enemy, thanks to better cohesion (local superiority) increases, in the mind of the individual opponent, the impression of personal danger. The larger the number of those morally vanquished at the moment of impact, the smaller the prospects of that unit's victoriously terminating the mêlée.

In a comprehensive study of the cavalry combats at Stresetitz in 1866, and at Ville sur Yron in 1870, Lieutenant-Colonel Wenninger* sought to obtain a clear conception of the collision. Such a thing as two cavalry forces in close order meeting and riding each other down did not occur. At Stresetitz, sixteen and a half escadrons and at Ville sur Yron thirty-five and a half escadrons, their own cohesion somewhat impaired, made a charge, which, not being pushed home, resulted in a mêlée. At Stresetitz, eight escadrons turned tail before they struck the hostile line.

"Against cavalry, the escadron charges in line, as a rule. The shock must be delivered with full force and in two clearly defined ranks maintaining firm cohesion.

*Über Verlauf und Ergebnis von Reiterzusammenstöszen. Ein offener Brief an alle noch lebenden Zeugen von Reiterkämpfen." Lieutenant-Colonel Wenninger, Commanding 1st Bavarian Heavy Cavalry Regiment, Vienna, 1.80 Kr. Kav. Monatshefte, 1908.

Cohesion, above all else, is decisive. Every trooper should know this, keep his place in ranks and maintain close touch.

"The two guides on the flanks of the escadron keep the escadron closed on its center. Small gaps in the front rank are removed by closing in; larger gaps are filled by rear-rank troopers moving up." (Par. 106, German C. D. R.). "The charge may be made without cheering only in case the attention of adjacent hostile units is not to be drawn to the charging unit." (Par. 109, German C. D. R.).

In order that the trooper, immediately after penetrating the hostile line, may be able to throw his horse about and begin the hand-to-hand fight, he must have a thoroughly trained, obedient mount. As a rule, the troops engaged in a mêlée continue to move in the direction in which the shock of the superior force was delivered. Frequently, of course, the shock alone may decide the action, hence the demand to make the first line as strong as possible, in order that success may be assured. The lance—whose superiority over the saber both in the shock and during the pursuit is unquestioned, though it may be a disadvantage in the mêlée in a crowded space—should induce us to bring about the decision by main force and cohesion at the moment of impact, so that the enemy will not take chances on a mêlée.

The impression produced by the collision is so tremendous that in a force that charges the enemy for the first time the example and encouragement of the officers is required to cause the men to make use of their weapons. Experience teaches that, if the mêlée does not come to a standstill but moves along over a wide space, the troopers rarely if ever think of using their weapons,* and the losses that the enemy suffers are in consequence insignificant.

*Three escadrons of the 1st Uhlans at Orleans. KUNZ, *Reiterie*, p. 305. 12th Hussars at Langenhof-Stresetitz.—Charge made by the Newmark Dragoons at Stresetitz (Königgrätz). V, QTISTORP.

The combat of small units with the *arme blanche* will invariably be decided in a very short time. When the opponents are completely intermixed, the mêlée may perhaps continue for a while at the point where the collision took place. Very soon, however, first one trooper here and there, then several, will withdraw from the fight, and the action will begin to move in one or the other direction. The various groups will now open up somewhat, and the mêlée will finally become flight on the one side and pursuit on the other.

The mêlée is decided most quickly by the action of fresh bodies in close order, especially if they attack from a flank in rapid succession. Charging in close order into the disintegrated mass, no matter if friendly troopers are ridden down in the process, such bodies drive the entire mass before them in the direction of the charge and on a front equal to their own. But they in turn gradually lose more and more of their own cohesion and effectiveness. The hostile troopers must be aware that their flank is attacked and that their line of retreat is endangered, before thoughts of turning tail become rife in their minds. If another unit tries to stem the headlong rush of retreating troopers by advancing against them, it will be carried away.* The best way for such a unit to differentiate between victor and vanquished (friend and foe) is to approach from a flank. It is immaterial in what formation such a movement is made.

**Königgrätz.** On debouching at the trot, in column of platoons, from a defile, the 4th Uhlans (great cavalry charge at Langenhof-Stresetitz), saw a large cavalry mass, Prussians and Austrians intermingled, approaching at a rapid pace from the left front. The two leading escadrons of the 4th Uhlans formed line and charged into the mass. The

*The leading escadron of General Clérembault's Division at the close of the cavalry action at Ville sur Yron. KUNZ, *Reiterei*, p. 142. Advancing straight to the front, at Stresetitz, the 3d and 4th Escadrons of the 5th Hussars, and the 3d Escadron of the 7th Hussars, were carried away by the fugitives. *Kavalleristische Monatshefte*, 1908, XI, p. 918. See also the successful flank attack made by the 16th Dragoons at Ville sur Yron. *Kavalleristische Monatshefte*, 1902, XII, p. 1023.

3d and 4th Escadrons followed the leading escadrons for the time being in column of platoons, then formed line to the flank by wheeling by platoons, and charged. This stopped the Austrian pursuit and gave the defeated 12th Hussars (Prussian) a chance to rally.*

Such a procedure is, however, permissible only so long as formed hostile bodies need no longer be reckoned with. Such hostile bodies must first be defeated before the leader of a unit that has not as yet entered the fight, can think of throwing himself into a mêlée. (Par. 418, German C. D. R.).

From this we may deduce the following: In order to assure a decision before a mêlée takes place, the shock must be delivered with as many troops as possible. If the troops are once launched, the first line should charge straight at the enemy, without apprehension for its flanks and with the firm conviction that these are best protected by the following units and by making the advance unhesitatingly. This and this only, ensures that the enemy will actually be struck, at the first impact, with the force that the leader considered sufficient.†

Since the mêlée of large bodies of cavalry extends over a large area and requires considerable time before a decision is reached, a shock delivered by fresh bodies is necessary to cut down the length of the action. Hence, the necessity of providing reserves to decide the mêlée, to take up the pursuit, or to cover the rally. In a cavalry combat of any magnitude, victory generally rests with the side that is able to bring into action the last formed body. The distribution in depth of the larger cavalry bodies is governed

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*_Geschichte des Uhlanenregiments Nr. 4_, p. 80.

Contrary View: "If a mêlée threatens to become disastrous, reserves are thrown in, on as broad a front as possible, not from a flank however, but straight to the front. The longer the front, the smaller the effect of flank attacks. Such attacks easily miss the objective and thus lead to a squandering of forces." v. Bernhardi.

†The German regulations thus declare against the independent employment of escadrons on the wings, which is required by other regulations. Such an employment is permissible only when there are no formed bodies following in rear of the wing that is attacked.

Example: The 1st Escadron of the 19th Dragoons during the cavalry action at Ville sur Yron. KUNZ, _Reiterei_, p. 138.

by the requirements stated above. It would be a mistake, however, if one is numerically inferior, to launch the various fractions one after another and thereby to deprive oneself of the advantage of bringing about the decision by the shock of a strong line. As a rule, an escadron or a regiment will launch all its parts simultaneously.

After the mêlée, victors and vanquished are in equal disorder. While the sense of elation produced by the knowledge of having gained a victory gives the victors an advantage over the vanquished, the greatest danger for the victorious cavalry lies in blindly rushing after the defeated force.

In reading the history of cavalry, we find recurring attempts to augment the shock by fire action and to make the trooper place greater dependence in the mêlée upon his firearm than upon his saber or his lance. Aside from endangering the officers riding in front of the line, this is not advisable for other reasons. When we consider the nervousness produced in the majority of horses by the sound and flash of a firearm discharged in immediate proximity to their ears and the extraordinary memory of these animals, it would appear to be by no means easy to maintain order, unimpaired cohesion and equable progress in a line of charging cavalry. But, if this is done, the force of the shock is not only broken, but the charging troopers themselves are greatly endangered by the fire of their comrades.

Toward the close of the South-African war, the Boers used mounted fire action when advancing to the attack.

In the United States cavalry, which still charges in single-rank formation, the revolver may be used before the shock, and mounted fire action is still used in the following cases:

1. When weak forces are to create a short delay;
2. In pursuit, when a mounted charge can not be made;

3. In covering a retreat, when it is risky to dismount or it is impracticable to advance to the charge;

4. In warding off a hostile charge that is moving over difficult ground.

Firing with the rifle, mounted, is to be confined, as a rule, to extended order formations, the interval between troopers being four yards.

Feeling its own inferiority, a unit that has been incorrectly trained, may take a notion to meet the charge of the hostile cavalry with volley fire (delivered at a halt), and to take advantage of the disorder attending the loss inflicted, by charging. There are serious objections to this procedure. In the first place, the shortness of the firearm and the distance between ranks enable but one rank to fire and compel each trooper to turn his horse forty-five degrees to the right. In the second place, aiming in an oblique direction is even less practicable than in the infantry. Besides, the requirement that the front of the charging body be approximately parallel to the objective can not be fulfilled, even in a unit of so narrow a front as an escadron, owing to the mobility of the objective. Although one may succeed in training horses so that they will tolerate firing from the saddle, the great majority of them can not be so highly trained as to make possible reasonably accurate aiming from the saddle. (Heaving of the flanks after covering some distance at the trot or gallop). If we reckon 200 m. as the distance that must be covered to get up speed to develop the momentum requisite for the shock, and thirty seconds for slinging carbines, grasping saber or lance, and pointing the horses straight to the front, the last volley would have to be delivered when at least 400 yards from cavalry that is advancing to the attack. Military history shows that cavalry that advanced with determination against cavalry that placed dependence upon this maneuver, invariably overthrew the latter. General Suchotin, Russian Army, a few years ago again advocated mounted fire action, but without finding many followers even in Russia. Practical tests made of mounted fire action under favorable conditions, in Russia, furnished unsatisfactory results.*

At **Soor,** on September 30th, 1745, the cavalry of the Prussian right wing charged in two lines against the Austrian carbineers and mounted grenadiers. The latter considered the ground over which the charge was made impassable on account of the steep slopes, and received the Prussian cavalry with carbine fire. Although this fire produced considerable confusion in the Prussian first line, the Prussian cavalry succeeded in breaking the Austrian line and in throwing it back upon its second line. Twenty-seven Austrian escadrons retreated in disorderly

*"*Neue Ausbildungsmethoden bei der russischen Kavallerie, von General* SUCHOTIN," translated by A. v. DRYGALSKI, Berlin 1892.

flight and enabled the Prussian infantry to make the attack on Graner Hill*.

In the action at **la Chaussée**, February 3d, 1814, French Cuirassiers received the Prussian Hussars, who advanced at dawn, with a carbine volley delivered at six paces. The French Cuirassiers were thrown back and in their flight carried away their second line. A battalion of Prussian infantry that had followed immediately upon the heels of the Hussars was enabled to take advantage of the victory gained. This very interesting action is unfortunately not well known.†

In the **Thirty Years' war**, the imperial troopers galloped back and forth firing their weapons as they went. Gustavus Adolphus, on the other hand, required his troopers to charge sword in hand after the front rank had discharged one pistol volley during the advance to the attack.‡ Charles XII, and Frederick William I (Orders dated March 8th, 1734) prohibited the use of firearms during the charge. The cavalry of Frederick the Great was permitted to fire from the saddle only after the hostile cavalry had turned tail.

During the cavalry actions of the **American War of Secession,** the cavalry of both sides evinced a strange predisposition for firearms, the saber falling, finally, completely into disrepute. The Confederate cavalry was from the outset mounted infantry, but did not hesitate to charge mounted. On the other hand, it dismounted to fight on foot in cases where European cavalry would undoubtedly have sought to bring about the decision by means of the *arme blanche.*¶

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**Kriege Friedrichs des Groszen*, II, Chap. 3, p. 73.

†v. OLLECH, *C. F. W. v. Reyher*, II, p. 223.

WEIL, *La campagne de 1814*, II, p. 140.

v. COLOMB, *Geschichte der preuszischen Kavallerie*, p. 19.

Look up also engagement at Zehdenick, April 5th, 1813, in MACKENSEN, *Schwarze Husaren*, I, p. 374.

‡According to CHEMNITZ (*Chronica Königlichen Schwedischen in Teutschland geführten Krieges*, I, p. 475): "He (Gustavus Adolphus did not take much stock in wheeling and caracoling. His cavalry was formed in three ranks, was to move straight at the enemy and to collide with him. The front rank only, or at most the first two ranks were allowed to fire, and then only when they were close enough to the enemy to see the white of his eyes; then they were to grasp their swords. The rear rank, however, without firing a shot, was to close sword in hand with the enemy, and each man in this rank was to keep both his pistols in reserve (the men of the two leading ranks, one pistol each) for use in the mêlée."

¶The following is taken from instructions issued by General Stuart in 1863: "The bad habit acquired from the enemy, and which is entirely dictated by cowardice, of advancing to the attack at a fast gait when a quarter of a mile from the enemy and of halting and firing at pistol shot range, is foolish and always useless. The revolver should never be used in a charge, except when the enemy is in rear of an obstacle and can not be reached with the arm, or when the trooper is separated from his horse and fights on foot, in which case this weapon is very effective." "If an attack fails, the sharpshooters (mounted) on the flanks are not to go to the rear but are to bring a concentric fire to bear on the enemy, and seek to delay him until the reserve comes up." It was thus that Stuart received his death wound.

In this connection, the cavalry battle at Brandy Station, June 6th, 1863, is interesting.

Heros von BORCKE, *Zwei Jahre im Sattel und am Feinde*, II, p. 203.

v. BORCKE-SCHEIBERT, *Die grosze Reiterschlacht bei Brandy Station*, Berlin, 1893.

As the war progressed, the Union cavalry imitated the example of the Confederate cavalry. Both were incapable of making a boot-to-boot charge across country. In the mêlée, the revolver brought about the decision. At the outbreak of the war, several Confederate cavalry organizations were even armed with shotguns and used the butts of these weapons during a mêlée. The revolver came into general use gradually. Under the peculiar conditions existing on the American theater of war, it proved more effective than either saber or lance, as the cavalry of both sides was not trained in the use of the saber, did not have supple, well trained horses, such as the hand-to-hand combat requires, and as, even in civil life, the American preferred the revolver to cold steel. Besides, life on the frontier with its combats against Indians and Mexicans had accustomed Americans to firing from the saddle. The situation would have been considerably altered, if fully trained European cavalry had been pitted from the very start against the Confederate cavalry before the latter was sufficiently trained. As it was, it became necessary to continue on the course that had been attended with success, and to perfect the tactics so far as this was possible in war time. As a matter of fact, the wooded and broken nature of the terrain favored the method of combat employed. The advantages claimed for the revolver, viz., its superior range and moral effect, the greater severity of wounds produced by it and its deadly effect in the mêlée* must be in part acknowledged, but come into play only with a corresponding national aptitude for its use. The fact that encouragement on the part of the leaders is necessary, as a rule, during a charge, to cause the men to use their weapons, shows that perhaps only a small percentage of the men possess the requisite coolness to use a firearm with telling effect. The advantages that Americans claim for the revolver are offset by corresponding disadvantages. These consist of the uncertainty of the aim, which, on account of the range of the weapon, endangers friend and foe alike, and the comparatively unarmed condition of the trooper as soon as the revolver is emptied. The use of the firearm is undoubtedly coupled with a deterioration of true cavalry spirit. This deterioration did not become apparent in the United States, it is true, so long as such leaders as Stuart, Forest, Grierson, and Sheridan rode at the head of the cavalry, but must inevitably appear when such leaders are wanting.

The result of great cavalry battles can not be judged, as a rule, by the numerical loss in killed and wounded. This loss, like disorder and exhaustion, is usually the same on both sides. But the vanquished force leaves a large number

*Engagement (November 1864) between a troop of Federal cavalry armed with sabers and a troop of Mosby's Cavalry armed with revolvers. Losses: Confederates, 1 trooper; Federals, 24 killed, 12 wounded and 62 prisoners (out of a total of 100 men). This is an extraordinarily high ratio of killed to wounded. SCOTT, *Partisan Life with Mosby*, p. 371.

of prisoners and horses in the hands of the victor, since only the latter is able to round up the troopers and horses that have become scattered and isolated on the battlefield. The moral effect of a victory exerts such a far-reaching influence that, after several victories, the defeated, intimidated, hostile cavalry evacuates the field without more ado, and leaves to the victor the freedom of pursuing his mission without let or hindrance.

It is well known that both French and Germans claim the victory in the great cavalry engagement on the plateau of **Ville sur Yron,** on August 16th, 1870. The Germans put in 2,935 sabers, and lost 44 officers, 385 men, and 416 horses. The French entered the fight with 2,540 sabers, and lost 85 officers and 525 men; the rather large number of prisoners could not be ascertained. The loss of the Germans amounted to 12%, that of the French to 26%.*

If the unit is defeated, the enemy will dictate at what gait and what distance it must retreat. During the retrograde movement officers and non-commissioned officers should endeavor to keep the unit in hand, so that, in case of necessity, they may be able to give it another march direction. "If the pursuit flags or help arrives, the leader directs the signal 'front' to be blown. At this signal, which is to be repeated on the trumpet by all the trumpeters, and shouted by all officers, non-commissioned officers and privates, every trooper turns to the front by making a left about. This is followed, as a rule, by the signal 'Rally.'" (Par. 112, German C. D. R.).

## 5. THE PURSUIT.

"The fruits of victory must be reaped by a vigorous pursuit in order to inflict as much loss as possible on the enemy, and to prevent him from again facing to the front. Bodies in close order follow him to turn his defeat into

*According to *Kriegsgeschichtliche Einzelschriften*, 25, p. 67.

annihilation and to secure the pursuing troops from a reverse. Units that can be spared are made available for new tasks." (Par. 419, German C. D. R.).

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"If both lines of the enemy have been thrown back, the front rank of the attacking first line is to fall out and to pursue.

"This is likewise to be done on the flanks by the Hussars, which, with the Cuirassiers, are to pursue the fleeing enemy, so that the escadrons will remain assembled and in good order not more than 200 paces in rear of the men that have fallen out to pursue.

"N. B.—In pursuing the enemy, the Cuirassiers as well as the Hussars must not give the enemy time to rally, but must pursue him as far as a defile, a dense forest, or some such obstacle, as the enemy will then suffer enormous damage.

"If the enemy becomes dispersed, those that pursue him must always seek to overtake his leading troopers, as those in rear will in any case be theirs, and if they gain the head of the fleeing enemy the others (of the enemy) will be theirs by that alone. During the action they (the pursuing troopers) are to cut or shoot down as many of the enemy as possible, and begin to make prisoners only when everything will soon be over.

"The second line, when it sees that both hostile lines are defeated, is to wheel, in conjunction with a few of the nearest escadrons, upon the infantry of the enemy, and charge and penetrate both lines of the hostile infantry simultaneously in flank.

"The King also hereby enjoins upon all commanders of escadrons that each and every one of them is to act for himself after the first charge. As soon as they have been in the mêlée, the one who has his unit formed first, must,

without waiting for his comrade, close with the enemy. For generals may be killed during the charges, or have their horses shot from under them, in which case it becomes the duty of the field officers to act at once on their own initiative, without reference to what the right or the left wing may be doing. One and all are to observe the general rule, that the front rank is never to be allowed to fall out until the two lines of the enemy are defeated. The man in ranks is accordingly to be well instructed in this."*

What Frederick the Great says above in his instructions dated July 25th, 1744, applies even under the conditions of to-day.

Clearly visible superiority of the enemy, unfavorable ground, and the prospect of getting under severe infantry or artillery fire, may determine the leader not to accept the charge and to avoid the collision. However, none but poor cavalry will, without orders, turn tail before the impact. In either case, the hostile cavalry will have gained an advantage and, if the retrograde movement begins within striking distance, will have to endeavor by pursuing to convert the retreat of the enemy into flight. For this purpose, escadrons and platoons are designated. These take up the charge as foragers at the command: "As foragers, March!." "Each trooper, cheering the while, takes up the pursuit without regard to direction, formation, and cohesion and endeavors to disable as many opponents as possible. The pursuit is terminated by the signal 'Rally'." (Par. 110, German C. D. R.). This maneuver will be effective if the hostile cavalry is routed, but not if it is retiring by order, for if it faces again to the front or is reinforced by fresh troops, the attacker is bound to suffer a reverse. In any event, formed bodies must be at hand.

*This quotation from instructions given by Frederick the Great to his cavalry, has been rendered as literally as possible consistent with clearness.—*Translator.*

According to the Austrian regulations, the pursuit is to be made by certain parts of the force in case the enemy turns tail when still a considerable distance away. If he faces about when only a short distance away, however, the unit nearest the enemy takes up the fast gallop and endeavors to cut its way into his ranks.

Katzler's so-called "long charge" at **Berry au Bac** on March 14th, 1814, is a warning example.

When York's and Kleist's Corps advanced toward the Aisne after the battle of Laon, Major v. Krafft was pushed across the river with one escadron of the 2d Household Hussar Regiment. "The enemy pushed back the flankers with superior force and posted an escadron of lancers on a height that obstructed all view. As no one knew what was behind this hill, it was rather a precarious undertaking to advance against the lancers. Major v. Krafft decided to lure the lancers from their hill. He told his men that he would lead them to within a short distance of the enemy, when all were to turn about and let their horses run, but that all were to rally at his first word and to face to the front as soon as the time came to renew the attack. This was done. As soon as he had faced his escadron to the rear, the lancers rushed wildly after him, and soon formed a wedge that had lost all control of its horses. Major v. Krafft now wheeled his escadron to the front and the lancers, who saw themselves outwitted, wanted to save themselves by crying 'Quarter, comrades, wer're desterters'. But the Hussars did not see it that way and during the chase, which covered nearly a mile, almost all the lancers were cut down."*

A defeated cavalry force can not rally unless the pursuer is driven off the field by fresh troops, gets under effective fire, or his horses are blown. A pursuit that is the continuation of a running hand-to-hand fight, will always stretch over a large area, so that men mounted on poor horses will be left behind. All leaders will endeavor to form all men not immediately engaged with an enemy into groups of two ranks. In doing this no attention should be paid to the formation, nor to the fact that the men belong to different organizations. With the units so formed they should throw themselves upon the enemy, as soon

*DAMITZ, *Geschichte des Feldzuges von 1814*, p. 153. This maneuver was also employed by Blücher during the campaign on the Rhine in 1794, and is described in the *Campagne Journal*, p. 91.

as he shows a disposition to face about or brings up his reserves. These groups assemble and form escadrons while advancing and constitute the first formed reserves of the leader. The superior commander will not be able until later to attempt to get formed bodies in hand. Units that have found no opponent or that were not launched in pursuit, at once place themselves at the disposal of the leader. (Par. 202, German C. D. R.). But all troops engaged in hand-to-hand combat with the enemy continue that action—not a single lance should be wanting. Failure to provide a reserve was responsible for the fact that the initial success of Colonel von Edelsheim's charge at Solferino, that of the British Light Brigade at Balaklava, and that of Bredow's Brigade at Vionville could not be followed up, and terminated in disaster. The French regulations prescribe that the pursuit be made "vigorously" (*l'épée dans les reins*), and that it reach out toward a flank and overtake the enemy, so as to cut him off and prevent him from again facing to the front.

## 6. THE RALLY.

The ability to rally quickly has ever been characteristic of good cavalry. It is only when cavalry can do this that it remains a flexible, useful weapon in the hands of its leader. Just when the rally can be executed depends upon the enemy and one's own intentions.* The escadrons rally in line. The formation to be taken up by larger units is ordered after the escadrons have rallied. As the rally is rarely followed by a forward movement, it is advisable to rally units larger than an escadron at once in column. The larger the force launched, the longer it takes to rally and the larger the area over which the cavalry is scattered. During the battle of Prague in 1757, eighty Prussian escadrons were

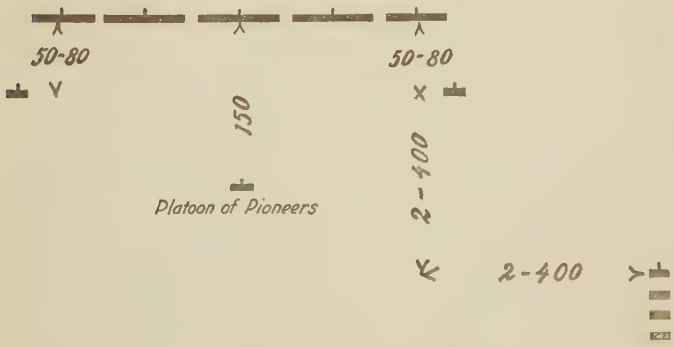
*Frequently both opponents begin to rally simultaneously, imbued with the idea that they are unable to bring about a decision. (Cavalry action at Trautenau).

completely scattered and could not be rallied until evening; only one regiment remained together. After the cavalry action on the plateau of Ville sur Yron likewise, a long time was required to rally the cavalry. The accounts of this action give ten minutes, half an hour, a whole hour, and even two hours as the time it took to rally all the units.* The German regulations of 1909 have abolished the rally to the rear, the so-called *Appell.* The occasional advantages that this form of rally may have, had disappeared through the disadvantages growing out of its misuse. Each trooper fights as long as possible—the mode of succumbing can not be prescribed in regulations.

### Provisions of Various Regulations.

**Austria-Hungary:**† *Formation*: The smallest unit to have a reserve is the *division*, so-called, which consists of three escadrons. The reserve provided in this unit consists of half an escadron. In addition to the line, the column may be used when it becomes necessary to break through the hostile line at any cost, or when time or room

**Attack Formation of a Regiment.**
**(Numbers indicate paces.)**




*At Hagelberg, August 27th, 1813, eleven escadrons of Landwehr cavalry rode a brilliant charge through French cavalry, which they surprised in camp, and through infantry of Girard's Division, which was in the act of forming. As the Landwehr cavalry had no reserve, it finally suffered a reverse, and as it was able to rally but slowly it took no further part in the engagement. v. QUISTORP, *Nordarmee*, I, p. 410.

Compare this with the surprise of the French cavalry by the 5th Prussian Cavalry Division at Vionville.

†Major-General Tersztyanski de NADAS, Austrian Army, *Gefechtsausbildung der Kavallerie.* (With 82 sketches). Vienna, 1907.

is lacking for deployment. The regiment, consisting of six escadrons, provides one platoon as a defensive wing 40—60 m. in rear of each wing. The platoon of pioneers is posted in rear of the center for the purpose of filling gaps in the attacking line or of falling upon an enemy who manages to break through that line. A reserve (about one escadron), invariably follows about 150—300 m. (200—400 paces) in rear and to the right or left, as the case may be, of the exposed wing.

Small detachments are to deceive and to occupy the attention of the opponent. Cavalry that is already deployed is to be attacked in flank. Pure frontal attacks are to be made only when time is wanting. On open ground, all officers in front of the line fall back to the line of platoon leaders when the attacking line is 750 m. from the enemy. In close country, they fall back as soon as the enemy is sighted. Two ground scouts from each escadron precede the attacking line by 250 m. The question as to when the gallop should be taken up depends upon the condition of the horses, upon the terrain, and the chance of surprising the enemy. When 75 m. from the enemy, the command Charge! is given, and each trooper urges his horse into a run and endeavors to be the first to reach the enemy. "Prematurely to increase the gallop to the run jeopardizes the success of the charge, as the troopers get too far apart, a condition which impairs the crushing shock of the mounted charge." "Fresh units are to be launched into a mêlée only when the outcome of that action threatens to become unfavorable to one's own side. Troops involved in a hand-to-hand encounter that is at a standstill, are most effectively supported when formed bodies continue to advance beyond and prevent fresh hostile troops from joining in the mêlée. Success is not assured until the last hostile unit has been defeated." When the enemy is defeated in the mêlée or turns tail while the attacking line has already taken up the charge, that entire line pursues. Only reserves and defensive wings follow in close order. In case the enemy retreats before the attacking line enters upon the charge, only one flank platoon pursues, if the attacking line consists of an escadron, or one escadron, if that line consists of a regiment, while the remainder, in either case, follows at the trot or at the gallop. At the signal to rally, all form in rear of the leader.

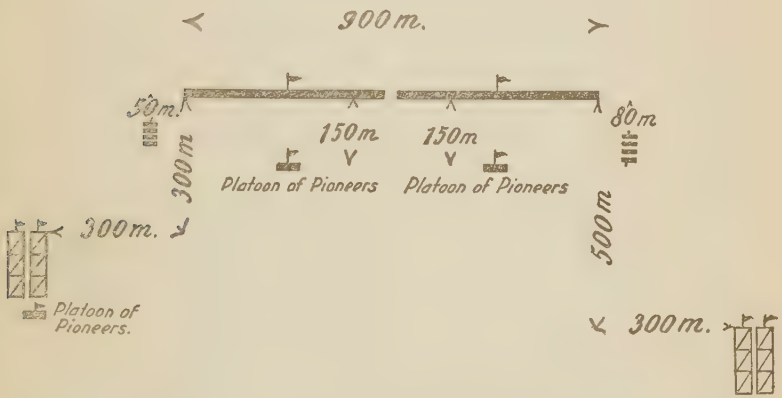
The Austrian cavalry division of two brigades (4 regiments or 24 escadrons) rarely moves in one body on the battlefield. Instead, it moves, as a rule, in groups, which operate concentrically against a common objective. This employment in groups accelerates deployment and facilitates posting the troops on the battlefield, but increases to an appreciable extent the difficulties of command.

A combat formation is not specially prescribed. The regulations contain principles only. From these we obtain the following: The division of a force into three parts best meets, in most cases, the requirements of battle; one strong group to deliver the shock, a second for immediate support, and a third as a reserve.

The *first line* contains the bulk of the entire force. Moving by the shortest route, its flanks protected by defensive wings and by the second line, this line delivers the deciding shock. If any escadrons of this line overlap that of the enemy, they wheel against his flank. The pioneer platoons follow in rear of the regiments and turn against hostile detachments that break through the line. In advancing to the attack, the first line moves in line of columns (the German line of escadrons in columns of platoons) or in double column.

The *second line* follows about 300 paces (225 m.) in rear of the wing on which the decision is sought. The second line throws itself, wholly or in part, against hostile forces that threaten the flank, endeavors to fall on the rear of the enemy during the mêlée and turns against any rearward lines that the enemy might have. During the advance to the attack, the second line moves, as a rule, in double column.

**The Austrian Cavalry Division.**




The *third line* (one-fourth of the entire force) follows the second at 400 to 500 paces (300—375 m.), and, in contrast to the second line, is not to endeavor, for the time being, to engage. Since it is the last available force, the third line is never to be thrown into the fight prematurely, but to be saved, at least in part, as long as possible for unforseen exigencies. But, on the other hand, the leader should not hesitate, if the situation demands it, to launch his reserve to the last man.

The leaders of the various lines independently determine the grouping and formation of their lines, and the distances between them. The brigade commander who furnishes one regiment for forming the third line, joins the division commander and remains at that officer's disposal.

The provisions of the **French** and the **Italian** regulations are similar to those of the **Austrian** regulations.

**France:** The regiment and larger units habitually employ a reserve. During the charge, intervals between escadrons are closed. The flank platoons follow the attacking line as flank guards (*garde*

*flancs*). A normal formation is not prescribed. The use of echelon formations that combine the advantages of line and column is recommended. The regulation of the gait, a subject that, in the past, was accurately prescribed (at 500 or 600 m. gallop, at 40 or 50 paces charge), is now left to the leader, who should endeavor to anticipate the enemy in charging. The charge is to be directed, if practicable, against the hostile flank and rear. It may likewise be advantageous to support a charge with artillery and carbine fire. After line has been formed and the gallop taken up, all the men riding in front of the line drop back to the line of platoon leaders at the command "To the Charge" (*pour l'attaque*). The command charge (*chargez*) is repeated by all officers and men when the collision is imminent. The French regulations, contrary to those of the Austrians, prescribe that (at the command charge) the troopers let their horses "stretch out at the gallop as quickly as possible without letting them get out of hand or without losing cohesion." "It is also important that, at the command charge, the bravest troopers riding the best horses be not held back and that their individual valor, which must finally decide success, leave to each one all the advantages of his boldness, tenacity, physical strength and skill. The short range of the charge ensures the maintenance of cohesion without impairing individual elan." When there is not enough room or time, or when the hostile line must be broken at any cost, the charge may be made in column, the leading platoon (or escadron) being followed, in this case, at a distance of 100 paces by the remainder of the force.

With the adoption of the Cavalry Drill Regulations of May 12th, 1899, the French cavalry definitely abandoned three line tactics, which had been used according to a fixed pattern. While the provisions of the regulations of May 31st, 1882, have nothing but an historical value at the present time, they are of interest as illustrating the excrescenses of normal, three line tactics.

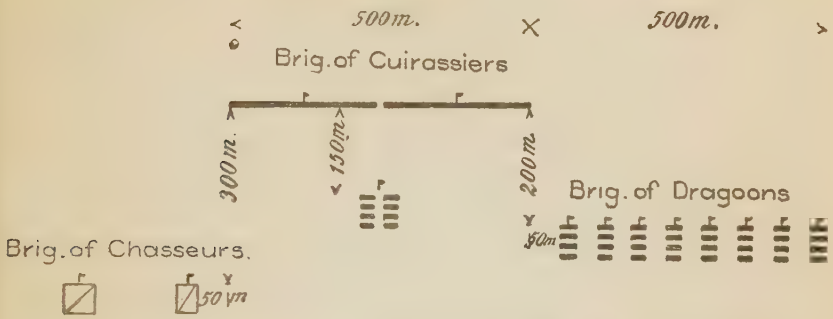
According to the 1882 regulations mentioned, the cavalry division, when attacking cavalry, deployed in three equally strong lines, the second and third following the first at 200—300 and 300—400 m. distance, respectively. The first line (*cuirassiers*) was the attacking line and moved straight to the front, the third line furnishing two supporting escadrons.

The second line was the maneuvering line. It was to be posted on the flank on which the decision was sought. Its duties were to support the first line, either by charging from a flank into the mêlée, or by turning against a second hostile line that advanced to attack. A simultaneous charge by the first and the second line was not to be made. The desire to support the first line required a rather hesitating conduct until the most favorable sphere of action had been recognized. For this purpose it also seemed desirable not to launch simultaneously all of the escadrons of the second line.

The third line remained as a reserve in the hands of the division commander. It was not to be launched into the fight as one body,

but a few escadrons at a time, as a general rule, for the purpose of reinforcing the other lines, and to meet hostile flank movements.

**The French Cavalry Division.**




**Provisions of the Regulations of May 12th 1899:** The brigades are employed as required by the situation. All normal formations are prohibited. When it is desired to make a frontal attack, one brigade in close order is launched. This brigade is reinforced and supported (*renforcée et soutenue*) by parts of the other brigades as circumstances require. The other parts subordinate their action to that of the line making the frontal attack. The reserve is not less than a regiment in strength. After a charge, each brigade rallies in line.

**Echelon Tactics:** The French Cavalry Drill Regulations of 1899 say in paragraph 452:* "The echelon formation, which combines the advantages of extended and close order, may find frequent application in action. This formation makes it possible to advance or refuse a flank or the center; to retain part of the force while another part carries on the action; to make successive attacks; to move to the counter-attack; and to outflank or envelop the enemy. This formation is, at one and the same time, offensive and defensive, and is especially well adapted to support the advanced troops. If these are defeated, they will not carry away the echelons following them, and do not hamper the action of these echelons.

"The echelon formation is not only advantageous when our fighting line overlaps that of the enemy, but also when we desire to compensate for a corresponding advantage on the part of the enemy. To envelop, it is only necessary to advance one wing; to prevent an envelopment, on the other hand, an overlapping wing is refused.

"But the use of echelons is not only to be recommended for initiating and carrying through an action, but during a retreat as well, to hold the enemy at a distance and to make offensive returns.

"In a word, the echelon formation favors maneuvering."

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**Kavalleristische Monatshefte.* 1908. *Die Entwicklung und der Stand der Staffeltaktik in der französischen Kavallerie.* von PELET-NARBONNE.

In the chapter devoted to the employment of the regiment, the use of echelons is likewise recommended (par. 607, French C. D. R.). We find here, among other things, the following:

"Their use rests in the first place, upon the principle of mutual support and coöperation of all parts of the force according to the instructions of the leader. In a regiment, the echelons may consist of single platoons, of escadrons, or of a demi-regiment."

The French believe that in the skillful use of echelons they have found an antidote against the "brutal onslaught" of the German cavalry. But in contrast to the formation in lines, each with an independent mission, the echelons are elements of one and the same body. Since all echelons have the same march direction as the leading echelon and get their distance* from the latter, it is very easy to take up this formation. The fact that each echelon in rear is a reserve for the one immediately preceding it, may be an advantage, but certainly hampers the unrestricted employment of the echelons and is apt to produce artificial conduct, which does not simulate war conditions.† This appeared during the experiments made under the direction of General Burnez during the cavalry maneuvers in 1906, to determine a suitable combat procedure against the German cavalry, which, according to French opinion at once forms a wall-like front followed by supporting escadrons for filling gaps, and which then rushes like "an enraged animal" at the enemy. It was decreed that a counter-formation be found against this unwieldy, thoughtless onslaught. In the first place, it was recommended that the first French line evade the attack made by the German line composed of one to two brigades, while the two other brigades advance right and left to make a flank attack. Theoretically this is undoubtedly correct, but its execution is attended with great difficulties. In the first place, the movements are by no means simple and require the most accurate coördination both as regards time and space. Secondly, since we must reckon with all sorts of friction in war, there is always something artificial, one is almost tempted to say unwarlike, about such movements. Besides, the proposed scheme counts upon an enemy who dispenses with reconnaissance; one who possesses neither energy nor independence; in fine, one who leaves his opponent complete freedom of action and who himself does next to nothing. The French had overlooked the fact that the German cavalry had abandoned the inflexible three line tactics and prefers the employment by wings, so-called. Thus, quite naturally, a solution was sought in launching one brigade frontally, while the other two brigades turn against the hostile flanks. Tests were made with a first line pushed far ahead. This

*For purposes of regimental drill, a distance of 100 m. between echelons is recommended.

†*Notes sur le Combat par un Irrégulier. Revue de Cavalerie*, Oct. 1907. *Echelons offensifs*, 15 paces distance between escadrons; *echelons en garde*, increased distance between escadrons; *echelons défensifs*, increased distances and intervals between escadrons. See *Militär-Wochenblatt*, 1908, No. 32.

line was to entice the enemy into attacking, only to retreat at a timely moment while retained forces fell upon the enemy from a favorable direction. It was also proposed to lure the enemy on with dismounted skirmishers (armed with the carbine) and with horse artillery, and then to charge him with the bulk of the force.*

In employing echelons, a distinction is made between the echelon as a maneuver formation and the echelon as a tactical unit. The latter has undeniable advantages, whereas the former makes supervision and maneuvering more difficult.

The following is taken from the instructions issued by General Burnez in 1908:

"Echelon formations are by no means a matter of fashion. They are, on the contrary, the simplest maneuvering formation, because they furnish the only means for disposing one's forces beforehand according to a preconceived plan of action, without thereby losing mobility. The deployed line is suitable for an immediate frontal attack only, but does not permit maneuvering; the column formation does permit maneuvering, but permits an immediate attack to be made in direction of its flanks only. The echelon formation, on the other hand, possesses not only the advantages of the deployed line, but those of the column as well. The following echelon formations are to be distinguished: one wing advanced; the center advanced; or both wings advanced. When they have different objectives, the several echelons may be independent of one another; otherwise they are bound to each other."

*Pursuit:* "The pursuit with so large a mass of escadrons consists of two actions, simultaneous but distinct. The one, immediate and direct, is executed by the escadrons already engaged with the enemy, who push him vigorously and strive for his destruction. The other is effected by the elements that remain in hand and that support the movement by seeking to cut the line of retreat of the enemy or impairing his offensive return movement. The *ensemble* of these dispositions constitutes the pursuit. If the enemy turns tail before the shock, a few units deployed as foragers will be thrown in at the head of the pursuing troops, the remainder of the division supporting the movement in good order."

In a cavalry corps, the divisions are employed in the same manner as the brigades in a division.

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*A description of the French divisional maneuvers, including all orders issued, may be found in *Revue de Cavalerie*, Dec. No. 1907, under the title *En marge des manoeuvres de Vittel.*

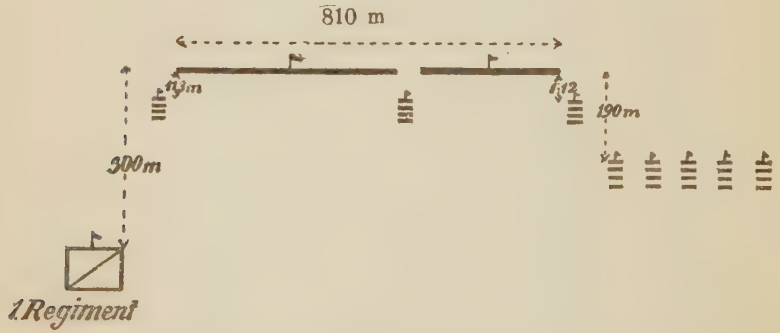
The French cavalry divisions have annual divisional maneuvers. Corps cavalry brigades and Chasseur battalions, as well as cyclist companies, sometimes participate in these maneuvers. The 1st, 2d, 5th, 6th, and 8th Cavalry Divisions consist of two brigades each; the 3d and 4th Cavalry Divisions, of three brigades of two regiments each; the 7th Cavalry Division, of five regiments. Each division has, in addition, two horse batteries, two machine gun platoons of four guns each, and a platoon of cavalry pioneers on wheels.

**Italy:** During a charge, all leaders, from the escadron commander on up, are posted in the line of platoon commanders. The cavalry regiment of five escadrons is to charge on as broad a front as possible and to overlap the enemy's line when practicable. The flanks are protected by retained platoons belonging to flank escadrons. Flank escadrons are to ward off or to execute flank attacks on their own initiative. A reserve follows 75—100 m. in rear of one of the flanks. A charge in echelon formation (*scaglioni*) is recommended, echelons to consist of two or three escadrons. The command charge (*caricat*) is repeated by all leaders. The shock is accompanied by cheering (*Savoias*).

The cavalry division consists of two brigades, each of two regiments (26 escadrons and 2 horse batteries).

In the assembly formation (*ordina di attesa*), the regiments or brigades are in rear of one another. A combat formation with suitable

**The Italian Cavalry Division.**




distribution in depth is assumed when the moment for action arrives. The following general principles are laid down for fighting cavalry: The *first line* (*schiera*) is made strong enough to assure that the enemy will be defeated. It is usually one brigade in strength, but this is not an ironclad rule. Of the ten escadrons in the first line, two follow 113 m. (150 paces) in rear of the flanks. Supporting escadrons (*squadrone di ricalzo*) are taken from the second or third, seldom from the first line. It is their duty to take a hand in the mêlée or to throw themselves upon the enemy if he has broken through the line. If the enemy habitually attacks with a strong first line, the supporting escadrons may be taken from the third line.

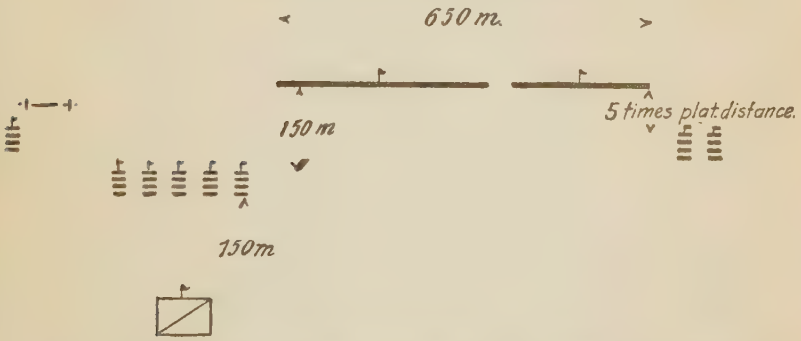
*The second line* consists of one regiment and follows 250 paces (190 m.) in rear of the exposed flank. Its duty is to protect this flank or to charge the enemy in flank during the mêlée.

The *third line* consists of one regiment and follows the first at 400 paces (300 m.). It remains in close order and is posted in rear of the center or in rear of the flank that is not protected by the second

line. The third line is launched when victory depends upon its taking a hand in the fight. The first and second lines simultaneously form line of escadrons as soon as they come under artillery fire.

**Russia:** The cavalry should endeavor to outflank the hostile cavalry and to advance to the attack on as broad a front as possible. A regiment acting alone is not to charge without providing a reserve. The latter follows 150—200 m. in rear of one of the flanks. The charge is developed either progressively from the trot (the gallop, being taken up when 300 to 375 m. from the enemy) or from a halt. For the charge proper, which is to take place when anywhere between 150 and 70 m. (200 and 100 paces) from the enemy, cohesion is not necessarily to be insisted upon in order that speed may not be sacrificed. For maneuvers, it is prescribed that when a distance of 150 m. has to be covered in a charge, an escadron is not to extend over more than five times platoon front.

**The Russian Cavalry Division.**




In a brigade acting alone, the first line consists of a regiment. The second regiment follows the first, two of its escadrons forming the second line, one the support, and the remainder (a demi-regiment) the reserve.

The cavalry division consists of two brigades, in all twenty-four escadrons, (among these there are six sotnias Cossacks) and two horse batteries. From the route formation, the division takes up the so-called reserve formation. In this, the brigades, their regiments in mass and abreast of each other with an interval of 30 m. between them, are posted in column with 42 m. distance between them. The horse batteries are posted in column in rear of and near the center of the cavalry. In changes of front and of formation, the base regiment moves at a walk. This makes the execution slow. Riding according to given directions and visual signals is prescribed, but rarely put into practice.

The combat order in three lines is to be taken up as late as possible. The distribution into three lines is to assure full development of force for the shock, while, at the same time, furnishing dependable

protection for the flanks and constant readiness to meet any and all contingencies that might arise during the fight.

The *first line*, destined to deliver the principal shock, must be stronger than the first line of the enemy, since the success of a cavalry action depends principally upon the success of the first line. The first line is formed in line of escadrons and forms line immediately before beginning the charge proper or when it comes under hostile fire. The flank escadrons form column of platoons and follow in rear of their respective flanks at a distance of not more than five times platoon front for the immediate protection of the flanks of the first line.

The *second line* supports the first and protects the latter's flanks. It assists the first line to deliver the shock and coöperates closely with that line, (1) in enveloping hostile flanks and in warding off hostile flank attacks; (2) in the charge against the enemy, when the success of the first line is doubtful; (3) in relieving the first line when the latter is repulsed; and (4) in reinforcing the first line. The second line takes up either one of the assembly or maneuvering formations or forms line of escadrons. Line is formed when the tactical situation or the effect of the hostile fire requires it. The second line is either echeloned in rear and some distance away from one or both flanks of the first line, or follows directly in rear of that line. The last mentioned position would be taken up, for example, in a charge against infantry or when room is lacking. The distance separating the second line from the first must not exceed 200 paces (140 m.). While in motion, it is considered desirable to reduce this distance, depending upon the terrain and the hostile fire, but in no circumstances to increase it.

The *third line* is the general reserve. It remains at the immediate disposal of the commander, (1) to ward off a sudden envelopment of the flank that is not guarded by the second line; (2) to rescue the first or second line from a dilemma; (3) to attack hostile forces that have broken through the first line; and (4) to retrieve an unfavorable tactical situation. The general reserve furnishes the leader the only means to repair blunders made in the distribution of the echelons and to conduct the action in accordance with the task allotted to him. The general reserve takes up either one of the assembly or maneuvering formations or forms line of escadrons and is posted in rear of the center or in rear of one of the flanks—usually the one not protected by the second line. The distance of the general reserve from the first line must not exceed 400 paces (280 m.).

"The senior commands, without further orders, in each line. In a division, for example, one brigade commander commands the first line; the other, unless he remains with the division commander, commands the second line. The nature of the echelon formation and the character of the cavalry combat require initiative on the part of subordinate leaders, for they must frequently act without being able to wait for orders. Manifestations of initiative on the part of subordinate leaders —provided such manifestations meet the requirements of the moment

and are consonant with the general instructions of the commander of the whole force—should not only be permitted but encouraged. The leader of the third line, however, does nothing without an express order from the division commander. It is only in the exceptional case when the division commander is absent that he takes such measures on his own responsibility as become necessary to ward off the enemy or to relieve friendly troops.

"It is the duty of all echeloned escadrons, if circumstances require, to charge the enemy's flanks without waiting for orders to that effect, to protect the flanks of their own force against hostile envelopment, and to protect the artillery in case its support proves too weak. The other escadrons, those of the first as well as those of the second line, remain in all cases under the immediate orders of the commander of the particular line to which they belong. On the other hand, it is of the utmost importance that unity of command, upon which unity of action depends, and coördination of all forces for the attainment of the object in view, be assured, and be not undermined by a desire for too extensive independence. For, in a cavalry action, this leads but to the one result, that the troops get completely out of hand."

**England:** In a charge extending over 1,600 m., 500 m. are covered at the trot, 1,000 m. at the gallop, and 45 m. at top speed. Up to the moment when the gait is increased to top speed, close touch and two distinct ranks are insisted upon. During the charge proper, however, each trooper endeavors to get the utmost speed out of his horse, with the firm determination to ride down his opponent. The interval between escadrons is 7 m. An echelon formation is recommended both for maneuvering and for combat. The cavalry division is led entirely according to the principles of three line tactics: Assembly, transition, and line formation. A cavalry division (two brigades, or eighteen escadrons) is to form as follows when charging cavalry: First line, one brigade (9 escadrons); second line, two regiments (6 escadrons, 250 m. in rear of the first line and at an interval of 100 m. from its flank); and third line, one regiment (3 escadrons). A strong third line may push supporting escadrons as far forward as the second line.

## 7. CHARGES BY SUCCESSIVE ESCADRONS.

Against cavalry, charges by escadron are justified only when debouching from a defile, or when, in deploying quickly from column toward a flank, there is not time enough to take up a more suitable formation. On debouching from a defile, the attack direction should be chosen with a view to prevent the force from being thrown back upon the defile in case of a reverse. Celerity in deploying from

a defile forms an important branch of cavalry training. In order to prevent distances between escadrons from becoming too great, and to clear the exit of the defile for the following units, the longest route should be assigned to the leading organization unless close proximity of the enemy (in a regiment in column of platoons, about 500 m.) requires that a force be thrown against him at once to gain the time necessary for forming line. But then there is always danger that the leading escadrons will be thrown back upon the next following units that have not as yet deployed. In deploying from a defile, horse artillery, machine guns and dismounted skirmishers will be pushed at a gallop beyond the defile to cover the deployment by their fire. The force passes the defile at a gallop in as broad a formation as practicable, and deploys, as a rule, by the flank, when practicable by both flanks, the leading element being halted. For a line of columns to cross an obstacle is not without danger, because the columns do not, as a rule, pass the defiles simultaneously and the enemy has an opportunity to defeat some of these columns in detail before the others can come up. For this reason, it is in this case also preferable to keep the force well concentrated and to cross the obstacle at one point, unless the available crossings are very close together. The success of the whole charge depends largely upon that of the leading element, which for this, if for no other reason, should be made as strong as possible.

The distances between escadrons are governed by their deployment one after another. If these distances are too great, there is danger that the escadrons will be defeated in detail.

## 8. THE CHARGE IN EXTENDED ORDER.

By giving up the close order and taking up the extended order formation, an organization loses shock power, as well as order, cohesion and efficiency. The troopers are thrown upon their own resources. Everything depends upon their personal courage and resolution. This is still more true the less the unit is habituated to rallying promptly, especially when this operation is not facilitated by troops following in rear. But, on the other hand, the mobility is increased. The best horses can go as fast as they like, and soon take the lead, whereas the slower ones fall behind. In a charge in extended order against cavalry, the danger of a reverse, caused by hostile bodies in close order, even if they are but weak, charging into the dispersed swarm, grows apace. But in charging infantry and artillery, the dispersed formation of the cavalry diminishes the losses. Against cavalry, the charge in extended order is used during the pursuit only. (Par. 610, German C. D. R.)

**Austria:** Each platoon covers a front of 100 paces, the troopers following their squad leaders. One of the center platoons of the escadron follows 45—60 m. (60—80 paces) in rear of the center or in rear of a flank.

**France:** Charge as foragers (*charge en forageurs*): In an escadron at least one platoon is in close order. The two men composing one file are to keep together for mutual support. Frontage, not to exceed 150 paces.

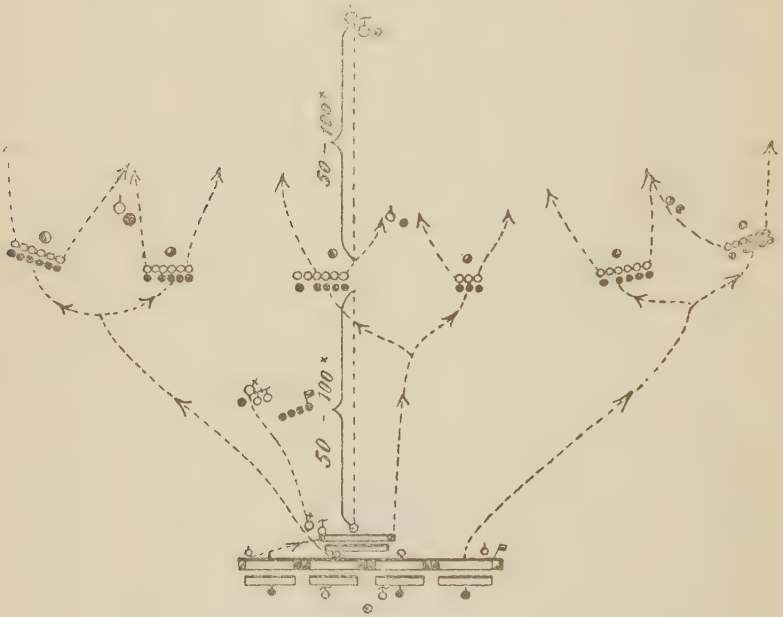
**Italy:** The charge may be made in extended order by the entire force, or by a part of it in conjunction with a charge in close order. During the charge as foragers (*carica a stormi*), groups of two, three or more troopers are to be formed.

**Russia:** In an escadron acting alone, a demi-escadron usually remains in close order and follows 70 m. (100 paces) in rear of the line of foragers, whose two ranks are six paces apart. In a regiment, several escadrons may advance to the charge in extended order. The reserve ollows the line in this case at 100 m. (150 paces).

## 9. THE LAVA OF THE COSSACKS.*

The lava may be classed as a charge in extended order in a restricted sense only, as it serves as much for maneuvering (reconnaissance and screening) as for an actual attack. The lava is the combat formation of the Cossacks and was

**Deployment of a Sotnia into Line of Half-Platoons (1st stage)**




originally transmitted to them by Asiatic nomad tribes of horsemen. Yelling and firing, the Cossacks swarm in dispersed formation all around an enemy, in order to induce him to disperse likewise, thus enabling them in hand-to-hand combat, to bring into play their superiority in riding and handling their weapons. The lava may be formed either from line or from column. In taking up

*v. TETTAU, *Die Kasakenheere*, Berlin, 1892. The word *lava* is an abbreviation of the tartar word *ablawa*, which means "hunting by driving game into an enclosed space."

the lava formation, a sotnia first forms line of half platoons 50 paces to the front, on the center platoon, and then deploys that line so that there will be one Cossack for every four paces of front. In this manner a sotnia covers a front of 400 m. One platoon follows the deployed line in close order. If this platoon also deploys, one non-commissioned officer and six Cossacks remain with the guidon* to mark the rallying point, the so-called *Majak* (lighthouse).

**Sotnia in Line and in Lava Formation.**
**(2d Stage)**

In the larger units, at least one sotnia remains in close order and follows 350 m. in rear of the deployed line. The great extent of front covered by the lava makes it possible simultaneously to envelop one flank of the enemy, to direct attacks against his rear, and to take advantage of any opening by partially assembling.† The lava is to be used

*Each Cossack regiment, as well as each sotnia, has a guidon. The regimental guidon is rectangular, is of the same color as the shoulder straps of the regiment, and bears the regimental number. The guidon of a sotnia is swallow-tailed and has two horizontal stripes, each one-half the width of the flag; the upper half is of the color of the shoulder straps of the regiment, the lower half is of the color corresponding to the number of the sotnia.

†In the Wars of Liberation, a similar combat formation was used by the Prussian Landwehr cavalry, though in this case it was the natural result of recruitment and training. The Prussian Landwehr cavalry used single-rank formation, avoided the shock delivered by bodies in close order, and attacked flank and rear of the enemy. *Aus dem Nachlasze des Generalleutnants v. d. Mar-witz*, II, p. 72.

"to avoid colliding with an enemy who is in close order; to wear him out by continually harrassing him in front and on the flanks; to divide and disperse him; and to entice him into hand-to-hand combat, in which the Cossacks, due to their great skill in horsemanship and in handling their weapons, will have the advantage over regular (*sic*) cavalry, which is better trained for fighting in close order. In addition, the movements of the lava may cause the enemy to commit blunders of which other bodies of cavalry can take advantage."

The Russian Cavalry Drill Regulations recommend that the lava be used for pursuit, for forced reconnaissances and for preventing similar operations on the part of the enemy. They further recommend that the lava be used to screen movements, to draw the enemy off from the attack direction chosen by him, to entice him into the attack direction of the other regiments and to cause him to make as many blunders as possible.

"Since," to quote from the regulations, "senseless blazing away only serves to encourage the enemy," none but the best shots should be allowed to fire, and they should fire at will. But several troopers, or entire units may dismount to fire. No opportunities are to be allowed to escape for falling in lava formation upon the enemy. This, however, is more a teasing and harrassing than a regular attack. Before making an attack, the regiment is always to assemble. Appreciation of the fact that, when confronted by an opponent in close order, the fighting power of a unit in lava formation is but small, has led the Russians to substitute the regiment for the sotnia as the tactical unit in the lava formation. By charging with its formed reserves, the regiment can take advantage of blunders made by the enemy.

At the signal or command "charge," the Cossacks are to ride at top speed and are to throw themselves cheering upon the enemy. In hand-to-hand combat, Cossacks may use the saber as well as the rifle.

Instead of the gallop, the Cossacks use an accelerated trot, the so-called *namjot*. At this gait they cover 283 m. per minute. Superior riding, absolute trustworthiness of the individual trooper, and skillful use on his part of his weapons, justified the lava formation. These qualities were developed, in the nature of things, by fighting on the frontiers with the nomad tribes of horsemen of Central Asia. These basic conditions are no longer applicable to a large portion of the Cossack armies.* This was demonstrated during the Russo-Japanese war. Horse breeding has been replaced by other, more lucrative, and at the same time more peaceful pursuits. The poverty of the Cossacks is constantly increasing. As they are obliged to provide their own mounts, they have to be satisfied with mediocre horses; in addition, the number of horses is decreasing. As a consequence, the number of Cossacks that is accustomed from childhood to horses is becoming smaller from year to year. The present generation did not grow up with martial

*The true Cossacks are at present in the minority in the Don army, for example, on account of the imigration of foreign elements.

ideas and under warlike conditions. The fund of military experience gathered during centuries and transmitted by inheritance, as it were, has gradually dwindled until not a trace is left. The Cossacks have become peasants, the Cossack regiments mediocre cavalry regiments of the Line. And with cavalry regiments of the Line, the Cossack regiments can not compete. The deeds the Cossacks are said to have per-

**A Unit in Lava Formation Assembling toward the Flanks.**

formed at the beginning of the 19th Century have been repeated neither in Poland in 1831, in the Balkans,* nor in Manchuria. But, be this as it may, their combat activity was insignificant, a few cases, notably that of the Caucasian Cossack Brigade at Lovtcha in 1877, excepted. The Cossacks were accused of cowardice and lack of discipline.

The Cossacks are not suited for close order movements. Their horses are undersized and, while possessed of extraordinary endurance in covering long distances, show little speed in covering short distances. As the Cossack horses are poorly trained and are bitted with the snaffle only, they are not well adapted for accurate movements in close order. No doubt, when a unit in close order is surrounded by Cossacks, it may be severely harrassed and even suffer losses, especially if the Cossacks operate in conjunction with Line regiments. To attack them in close order is futile as the Cossacks in lava formation evade every collision and can not be caught at any point. But even granting that the Cossacks possess superior skill in handling their sabers and lances,† a statement that is contested by the Russians themselves, cavalry of the Line is superior to them in speed, and in size and weight of mounts. The superior stature of his mount gives the cavalryman of the Line a distinct advantage over the Cossack in hand-to-hand combat. The German

*The frittering away of Cossack regiments in orderly and escort duty, so that not infrequently only the regimental commander with his officers remained with the standard, is held responsible for the failure of the Cossacks. "One is accustomed in the service, to look upon the Cossacks as an auxiliary force that one can sacrifice to preserve the rest and security of the troops of the Line.

†Front-rank men carry the lance, except in the Caucasian regiments, which are armed with saber and rifle only; rear-rank men carry the Cossack saber without guard; both front and rear-rank men carry the rifle without bayonet.

lance is about 40 cm. longer than the Cossack lance. The superior speed of our saddle horses (accelerated gallop 560 m. per minute, as compared with the accelerated *namjot* of the Cossacks, 425 m. per minute), enables us to overtake a fleeing Cossack. On account of its inaccuracy, flanking fire delivered from the saddle is not to be recommended in fighting Cossacks. It would be better for us to rely on the superior training of the German trooper in hand-to-hand combat, and to sail vigorously into them with the lance, several troopers, in this case, habitually acting in concert. At any rate, when fighting Russian cavalry, it will be a good plan to provide defensive wings. These should follow in rear of the units in close order, as a protection against the lava. These wings are to assure that the bulk of the force can pursue its object unmolested. More than a few platoons, or at most escadrons, should not be employed in combating the lava. These units allow the lava to approach close enough to make sure that they can overtake it. One thing must be avoided, and that is inactivity, as this increases the chances of the lava attack succeeding, and may even expose one's own force to defeat. "The operations of the lava will be attended with success only when the opponent is surprised and does not fathom its object." (Cossack Regulations 1899). From the foregoing, it follows that the lava formation of a Cossack unit not operating in conjunction with cavalry regiments of the Line, is, comparatively speaking, little to be feared. It is only when cavalry regiments of the Line are ready to take advantage of every opening caused through combating the lava, that it becomes a formation whose formidableness must not be underestimated. The importance of Cossacks in operations on a theater of war in western Europe depends less on their military efficiency than on their large number, Russia possessing 670 sotnias.

At **Luckenwalde,** August 19th, 1813, a French Cuirassier regiment, advancing at the trot in column of escadrons, was attacked by Cossacks, the flankers that it had thrown out being forced back. "The French advanced against the center of the Russians. The latter's thin line at once dispersed, all the Cossacks throwing themselves against the flanks and rear of the French. The French column halted when it no longer had an enemy in its front. Meantime, the Cossacks thrust or fired into the flank files and rear ranks of the French Cuirassiers. After a while, the French column was in such confusion that orderly movement was out of the question. The Cossacks, though numerically inferior and unable to disperse the French column by charging it in close order, were elated because they felt that they were better horsemen than the French, and continued with great glee to fire their rifles and thrust their lances into the French ranks. The flank files and rear line of the French finally turned to the flank and grasped their carbines." The Cuirassiers were not relieved from their unhappy predicament until fresh cavalry arrived.*

At **Boragk,** September 19th, 1813, 1,200 Cossacks attacked 2,000 French Dragoons. The latter remained passive, received the attack with carbine fire and sought to form line in place to avoid being enveloped.

*v. QUISTORP, *Nordarmee* I, p. 215.

The action terminated in the rout of the French cavalry. In a quarter of an hour the Cossacks made 19 officers and 400 men prisoners.†

During the engagement of **Rudnia,**‡ August 8th, 1812, Count Bismark had his troopers form square without dismounting, and repulsed the attack of the Cossacks at a halt. But his situation was not relieved until reinforcements arrived, otherwise he would, undoubtedly, have succumbed.

†*Ibid.*, II, p. 31.

‡Count v. BISMARK, *Ideentaktik der Reiterei*, pp. 261–263.

## V. CAVALRY VERSUS INFANTRY.*†

The principal strength of cavalry lies in its ability, thanks to the speed of its horses, to surprise the enemy, and in the moral effect, not always sufficiently appreciated, it is true, produced by its irresistably approaching line. The main strength of infantry lies in its fire power. Infantry that fires deliberately and steadily is invincible so far as cavalry is concerned. But, as the morale of infantry gradually dwindles during a protracted fire fight that entails heavy losses, the moral effect of a cavalry charge and the chance of its succeeding, increase and the losses suffered by the cavalry decrease proportionally. It is hardly probable that the 18th and 19th Centuries witnessed such demoralized infantry as is bound to be produced by every serious modern fire fight.

The skirmisher who has participated in a fluctuating fight lasting from six to eight hours, his nerves constantly jarred by the incessant roar of the firing and his whole being stirred by the tremendous excitement incident to the scene of every battle, without a single opportunity to rest or even to draw a quiet breath, is physically and mentally exhausted. To be sure, the material and moral deterioration of the infantry is not the same all along the line, but there will always be sections in which the infantry will be completely worn out, and these localities are the most favorable field for cavalry operations.

There is a vast difference between infantry enlisted for a long term of years and retreating while exposed to the fire of smooth-bore muskets and modern infantry, which

*Pars. 113, 114–177, 201, 224, 440–443, and 522, *German C. D. R.*

†Examples from the Franco-German war are taken from KUNZ, *Kriegsgeschichtliche Beispiele*, 5 and 6.

is obliged to cross the entire zone of effective fire of the magazine rifle without being able to avail itself of cover. Compare the condition of the fragments of the Prussian infantry at Etoges in 1814 with that of the 38th Brigade (Prussian) at Mars-la-Tour; the state of the British Füsilier Brigade at Albuera in 1811 and of the British Guards at Inkerman in 1853, with the meagre resisting power of the British Guards at Modder River and of the Highlanders at Magersfontain. "At such a moment it is quite immaterial whether these fragments carry a repeating rifle, a flintlock musket, or a pitch fork." (F. Hönig.) Just because favorable situations were not seized and utilized in the more recent campaigns, it does not necessarily follow that the days of battle action are over for the cavalry.

The fact that small caliber bullets have very little stopping power and that a horse struck by a bullet at short range will frequently have strength enough left to carry its rider into the hostile ranks,* augur well for the success of a mounted charge.

During the Franco-German war, mounted charges made by small bodies of cavalry against unshaken infantry, with few exceptions, did not produce an appreciable effect, but were almost invariably accompanied by tremendous losses. To produce a result would have required systematic

*Lieutenant v. Salzmann writes the following anent his book (Im Kampfe gegen die Hereros, p. 146) to Captain Count Schwerin (Kavalleristische Monatshefte, Nos. 8 and 9 of 1907, p. 698): "The bullets were fired at me and my horse at a range of not over 100 m. It is of course impossible for me to give the range with absolute accuracy, for, after all, I myself do not know which one of the men fired the shots. The maximum range was, at any rate, not over 100 m., for one can not see farther in the dense brush. Most likely it was from 30 to 50 m. I am convinced that the shots were fired from quite modern breechloaders, for all three bullets made clean holes. I still have the bullet perforated cinchas showing the entrance and exit of the bullets. I remember very distinctly that the bullet that struck my horse in the breast produced a wound about the size of a hand on leaving the body on the right side. This was undoubtedly due to the fact that the point of the bullet had been filed off. All three bullets came from the left. My horse carried me perhaps 1,500—2,000 m. farther, though it grew weaker with every step, and finally stopped short and broke down."

preparation and the action of large masses of cavalry.* But when the hostile infantry can be surprised, when it loses its head, formation and numbers are immaterial.

This is strikingly illustrated by the charge made by the 9th Uhlan Regiment at **Monnaie,** December 20th, 1870.—The regiment (¼ of the 1st, ¾ of the 2d, and ¾ of the 4th Escadron) followed the forward movement of the German infantry on the left flank, and at Château Meslay turned into the *chaussée* leading to Tours. While advancing along the village street, the regimental commander received a message to the effect that hostile infantry was retiring in disorder along the *chaussée*. The regiment charged in column of threes, its leading element turning toward the right into the *chaussée*, thus splitting the French column into two parts, the larger of which continued its retreat toward Tours. The regiment charged in column of threes along the *chaussée*, riding down and tossing right and left into the ditch all before it. After charging through the entire hostile column, the regiment rallied and re-formed. It had lost 1 non-commissioned officer and 4 Uhlans killed, and one officer and 4 Uhlans wounded. The entire loss was sustained by the leading platoon. Half an hour later, the regiment received orders to pursue the enemy, who had retreated toward Tours. Many prisoners were taken. North of Notre dame d'Oé three French battalions were seen posted astride the road. They constituted the intact part of the column through which the Uhlan regiment had broken and against whose tail it had made a successful charge. The softness of the ground on either side of the road prevented the Uhlans from forming line. But, as the French infantry seemed shaken, the commander of the regiment determined to charge again in column of threes. The gallop was taken up when the column was 400 m. from the French. The signal "gallop" was not obeyed by all the units simultaneously, as it was not understood. The French infantry, however, had completely re-established order in its ranks, and held its fire until the Uhlans came within 25 m. Though a part of the Uhlans managed to break into the hostile line and 1 officer and 24 men broke through and galloped on to Tours, the number of dead horses piled up on the *chaussée* prevented the rear platoons from reaching the enemy, and the regiment had to retire. During this second charge, the seven platoons of Uhlans engaged (about 168 men) suffered the following loss:

| | |
|---|---|
| Killed: | 5 officers, 19 men, 34 horses; |
| Wounded: | 3 officers, 8 men, 12 horses; |
| Missing: | 1 officer, 24 men, 26 horses; |
| Total: | 9 officers, 51 men, 72 horses. |

*General Gallifet's first charge, directed against the 9th and 12th Companies of the 87th Prussian Infantry at Sedan, undoubtedly would have reached the insufficiently protected artillery of the XIth Army Corps, if the two other regiments of the French division had followed the first line. KUNZ, *Kriegsgeschichtliche Beispiele*, 5, p. 28.

To surprise infantry in battle does not seem to be without prospects of success.* Infantry relaxes its attention on its flanks when engaged in a hot fire action with hostile infantry. While the eyes of all arms are turned toward the advancing cavalry, which is discernible at a great distance, the infantry but too often neglects to look out for other cavalry lines that, under cover of a feint, charge from an entirely different direction. And even if the cavalry does not reach the enemy's line without being fired upon, the infantry will, in any event, be obliged to divide its fire.

The *mounted charge against infantry* is made more difficult:

1. By the improvement in firearms, which enables even poorly trained infantry to repulse the charge made by efficient cavalry† and which gives defeated infantry a greater power of resistance.

The use of smokeless powder makes it more difficult for cavalry to surprise infantry. The great range of projectiles forces cavalry, especially that of the attacker, to keep away from decisive points, unless the terrain enables it to get a covered position in closer proximity.‡

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*During the battle of Königgrätz, the 1st Escadron of the 10th Hussars, on debouching from the Swiep Wald, surprised the IIId Battalion of the 51st Infantry and took 16 officers and 655 men prisoners. *History of the 10th Hussars*, p. 90.

During the battle of Custozza, June 24th, 1866, three platoons Sicilian Uhlans under Captain Bechtoldsheim (3 officers and 101 men) broke entirely through Pisa's Brigade (Italian), which was deployed for action, and struck the following brigade, Forli's, which was in route column, with such force that of the five battalions composing that brigade only one remained intact. The division and brigade staffs were completely dispersed and two guns were taken, but these could not be brought off. The Uhlans lost 2 officers, 84 men, and 79 horses. *Österreichs Kämpfe*, II, p. 74.

†Charge against a square of French Chasseurs at Sapignies, January 4th, 1871.

‡Toward 12 o'clock, noon, August 16th, 1870, the commanding general of the IIId Army Corps ordered the 6th Cavalry Division to attack the retiring infantry of Pouget's Division (French). When the cavalry appeared on the plateau, French infantry could already be seen advancing again everywhere. KUNZ, *Reiterei*, p. 100.) The reasons given in *Gen. St. W.* I, p. 576, for holding back the cavalry division so far and for deploying it slowly, were not shared by the commanding general of the IIId Army Corps. *Kriegsgeschichtliche Einzelschriften*, III, pp. 555 and 557. WOIDE, *Ursachen der Siege*, I, p. 288.

In the days of smooth-bore muskets, on the other hand, cavalry was able to wait in immediate proximity of the decisive points for the appearance of opportune situations. But, it should always be remembered that a hit does not necessarily stop a horse, for even a wounded horse will frequently reach the enemy's line and not break down until he reaches it.

2. By *changed infantry combat tactics*, which derive greater power of resistance from the terrain, and give the various units greater independence.

3. By *increased and more extensive cultivation of the ground.*

The moment favorable for making a cavalry charge is usually of brief duration and difficult to recognize, since cavalry must usually remain distant from the decisive points. Favorable opportunities for charging occur when infantry runs out of ammunition, or suddenly suffers severe losses that impair its morale; when infantry, after making an attack that has been repulsed, has to retire under the uninterrupted fire of the defender, or when it is desirable to hold the enemy within the effective fire of one's own infantry, and to induce him if possible, to change front or to take up a denser formation. When coöperating with infantry, a threat to charge frequently suffices to bring about the desired result. (Austrian cavalry at Königgrätz).

The task of stopping a hostile advance (Bredow's Brigade at Vionville), of helping the infantry over a grave crisis and of facilitating its retreat, is a difficult one. But when the infantry sacrifices its very best troops in attack as well as in defense, the cavalry should not be wanting. "Even temporary relief afforded the retiring infantry and a little time gained, may often avert a complete defeat. To cavalry that succeeds in doing this will belong, if not the palm of victory, at least the honor of the day." (Par. 518, German C. D. R.). The more parts of the enemy

are threatened and forced to take counter-measures, the greater the relief afforded the sister arms. The intention to charge must be communicated to the infantry commanders concerned so that they can take advantage of the time gained for them and that the sacrifice of the cavalry may not be made in vain. (Par. 442, German C. D. R). "The arm is too valuable to accomplish nothing." (General von Schmidt.) Popular historians love to dilate on "rides into the jaws of death," and thereby add anything but clearness to their descriptions of cavalry charges. In speaking of the appellation "ride into the jaws of death" given to the charge made by von Bredow's Brigade, General von Alvensleben says: "We had become unaccustomed to launching cavalry in such a manner." Bredow's Brigade (6 escadrons, in all 740 men) lost, 16 officers, 363 men, and 409 horses, or 54 per cent. If such expressions become current, they can have no other than a harmful effect. If its attack is repulsed, infantry must count on suffering similar losses. But, whereas such an infantry attack must be considered a defeat from a tactical viewpoint and seldom brings about a concrete result, a costly mounted charge, even if repulsed, as a rule produces such a far reaching moral effect on the enemy, that the sacrifice is well worth the price. Therefore, let us not talk of a "ride into the jaws of death," but of a "ride to victory" of Bredow's Brigade. Insufficient preparation, indeed, did make the charge of the French Cuirassiers at Wörth a veritable "ride into the jaws of death."

According to the French General Staff Account of the Franco-German war, the twelve batteries present on the height between Rezonville and the Roman road during the charge, left their positions. The 7th and 12th Batteries of the 8th Artillery, which were not struck by the onslaught, were the only ones that were able to go into position again after they had retired as far as the patch of timber. The other ten batteries fell back upon their reserves for the purpose of making good the losses suffered by their personnel, but took no further part in the fight during the day. The ten batteries mentioned lost 164 men and 183 horses. The 75th Infantry and the twelve companies of the 93d

Infantry retired to the Bois Pierrot where they remained until nightfall without again taking part in the action. Six companies of the 93d Infantry alone, remained on hill 306 on the right of the 70th Infantry. "The heroic charge of the German cavalry," to quote the French General Staff Account, "attained the object that the commanding general of the IIId Prussian Army Corps had in view. The terrain over which the charge passed was evacuated by the bulk of the French infantry; the artillery in action north of the *chaussée* was, likewise, almost completely dispersed. The long line of guns on the Roman road was now disintegrated. From the opening of the battle the guns in this line had very severely annoyed the Prussian 6th Division and had done their share in pressing back the left wing of that division as far as the Forest of Tronville. The German infantry, which just a few moments before had been seriously threatened, was again enabled to advance on both sides of the main road. Finally, the lull that succeeded the powerful charge everywhere raised the confidence of the Prussian troops, who fully realized that they had escaped from grave danger and had passed through a crisis that, prior to the arrival of the expected reinforcements, might have had a bad ending."

**Custozza,** 1866. The 13th Uhlan Regiment of Pulz' Brigade charged the 16th Italian Division. The second line, consisting of the remainder of the brigade, threw back some Italian cavalry and then made an unsuccessful attack against a square. Three escadrons (450 lances) of the first line rode through a dense skirmish line and charged four and a half battalions (1,600 rifles). The defensive wing of the first line, one escadron (150 lances), at the same time fought against three and a half battalions (1,400 rifles). The flanks and rear of the infantry were protected. The losses were as follows: Uhlans, 10 officers and 350 men, Hussars 30 to 40 men killed and wounded; Italian infantry, 4 men killed and 10 men wounded; Italian cavalry, 8 officers and 100 men killed and wounded. Results: (1.) The Italians (7th and 16th Divisions) believed this charge to be the precursor of a general offensive movement. They accordingly discontinued their advance and were kept away from the actual battlefield. (2.) Panic among the trains. (3.) Withdrawal of the 16th Division, which was unable to take further part in the battle. The charge was made at 7 o'clock A. M., but, as late as 4 P. M., the two infantry divisions still stood in front of Villafranca, rooted to the spot, as it were, by the impression produced by this reckless onslaught. The same cavalry regiments then made another charge about 5 P. M. the same day.*

**Vionville—Mars-la-Tour:** Charge made by the 1st Regiment of Dragoons of the Guard to relieve the 38th Brigade, which had been repulsed with a loss of 75% of its officers and 54% of its men. The charge struck two French regiments. The Dragoons had 16 officers, 410 men and 426 horses. They lost 13 officers (81.25%), 125 men (30%), and 246 horses (60%).

**Österreichs Kämpfe,* II, p. 61—65, 91, 177.
STROBL, *Custozza* pp. 23 and 59.

Results of this charge: (1.) Time was gained. (2.) The 5th Light Battery of the 10th Field Artillery Regiment, was able to limber up. But after repulsing the charge, the French advanced for some distance.*

The front and flanks of a body of infantry in proper formation are equally strong, notwithstanding the fact that a flank attack always produces a greater moral effect than a frontal attack and that it takes longer to form a firing line toward a flank than toward the front. In picking out an attack direction, it is better to select the shortest route, than first to lead the cavalry into the flank of the hostile infantry, unless the terrain makes a covered approach possible. When a crisis in the battle necessitates launching the cavalry, there will usually be no time to gain the most favorable direction for the attack by making an extended movement, and the shortest route will then be the best route.

When the infantry combat nears its end, and the distribution in depth that obtained during the opening stage of the action has disappeared through absorption of supports and reserves, the fire power of the infantry toward a flank will be noticeably weaker. Moreover, it will frequently be impossible, in such a case, for the infantry to form a new firing line when under hostile infantry fire, if it desires to avoid exposing itself to annihilation. A flank attack made at this time will, therefore, have a better chance of succeeding. A flank attack should strike not only the leading line of the enemy, but the lines in rear as well at the same time. If these lines in rear are not so struck, their attention should at least be occupied. When the objective is narrow, distribution in depth may well be employed even by individual escadrons. If this is not done, and the cavalry advances on a broader front, a large number of troopers will strike nothing.

Infantry in route column had best be attacked in front or rear. An attack should not be made against the

*_Kriegsgeschichtliche Einzelschriften_, 25 p. 57.

flank of such a column, as it can form a firing line very quickly in that direction.

In charging infantry that is shaken or surprised, the formation employed, the strength of the charging body, and the direction of the charge are immaterial. The important thing is to seize the proper moment and quickly to make the most of it. An attack against infantry that is shaken but little or that is intact requires a large force, on the other hand, in order that there may not be a single fraction of the hostile infantry whose attention is not completely occupied. (Par. 440, German C. D. R.).* According to all experience, infantry, when charged by cavalry, relaxes its observations on the flanks. For this reason, a charge is launched either from several directions, or from one direction on a broad front, but with proper distribution in depth. As soon as cavalry comes under effective infantry fire, it can do nothing but ride straight to the front or to the rear. It must, therefore, gain the proper attack direction before entering the zone of infantry fire. Cavalry can cross this fire zone in a single line, in extended order, at a gallop increased progressively as the enemy is approached. This movement may be interrupted by breathing spells under cover. Since the force of the impact is of less importance in this case than to get at the enemy, no matter how, the charge may be made at an accelerated gallop. When practicable, the attack is made simultaneously from several directions. The infantry will then be forced to deploy in various directions and to scatter its fire. The moral effect produced on the infantry by this attack from several directions, must not

*At Sapignies, January 4th, 1871, seven platoons of the 8th Cuirassiers charged the square of a French Chasseur battalion. The Chasseurs held their fire until the Cuirassiers came within 80 m. One escadron, which was to turn against a flank of the square, was stopped by an impassable ravine, so that in reality only three platoons advanced to the charge. They were repulsed, although some of the Cuirassiers had broken into the square. The three platoons lost 2 officers, 29 men, and 73 horses (32% of the troopers, and 80% of the horses). Although the intention of charging the square from several directions was correct, the force employed was much too small. KUNZ, *Reiterei*, p. 243.

be overlooked. Frequently, various bodies of infantry will likewise fire upon one another in such a case. When time and terrain admit, escadrons are placed in readiness for this attack, either singly or in groups. The cavalry should endeavor to strike the infantry simultaneously in front and in flank, but this is not essential. It is, in fact, desirable that the infantry develop its fire toward the side on which the principal cavalry charge is not contemplated.

When unshaken infantry can not be attacked from several sides, the charging cavalry will require distribution in depth, in order that at least a part of it may strike the infantry. Successive lines are the result. These lines—"waves," so-called—follow one another at a distance of 200 paces. The second line charges that part of the hostile infantry that was not struck at the first impact. Charges made on a narrow front succumb to the concentric fire of the infantry. Charges without proper distribution in depth lack the necessary force. A broad front can be combined with appropriate distribution in depth in large units only. A broad front alone promises success. If individual escadrons seek their own objectives, they will frequently miss them entirely. One may make the objection to this procedure that no line will rely upon its own strength alone, but will hope that in case of failure, the other lines will be more fortunate. It is easier for infantry to ward off such a charge, as it is confronted, for the time being, by one target only. Furthermore, it is to be remembered that speed and cohesion of rearward lines are bound to suffer when these lines encounter fallen horses and troopers. (Charge of the Cuirassiers of the French Guard at Vionville).* If the leading line turns tail, there is danger that it may carry along with it those in rear. The disadvantages of successive lines are

*The charge made by General Gallifet during the battle of Sedan, shortly after 9 A. M., with three regiments and two escadrons (in all 17 escadrons or 1,500 troopers) failed for the same reason on encountering the fire of five companies of the 82d and 87th Prussian Infantry Regiments. As the charge came as a complete surprise, these companies delivered their fire at 50 m. *Gen. St. W.*, II, pp. 1217 and 1218. KUNZ, *Kriegsgeschichtliche Beispiele*, 5, p. 57.

diminished if the cavalry charges with the escadrons in the first line posted at intervals and those in the second line opposite these intervals. If the cavalry once gets among the infantry, the latter's defense will be made much more difficult. "Anyone who has seen a cavalry charge against infantry, will have the following impression of it: The infantry at first completely loses its head (Grenier's Division of the VIth Corps at Vionville), forgets that it has rifles, scatters in all directions and thereby uncovers the artillery, transmits confusion to the rearward echelons, and, by its rush to the rear, prevents those echelons from firing. In the second stage, the infantry recovers from its fright; it opens fire, more from fear than from reflection, and, therefore, as a rule, without effect; it halts and rallies for the purpose of stemming the tide of the hostile onslaught."*

It is the duty of the reserve to prevent this rallying and to increase the confusion and panic in the ranks of the infantry. A cavalry charge against infantry and artillery in the latter's vicinity, calls all available hostile cavalry to the scene of action. The charging cavalry will therefore need a reserve with which to turn against this new opponent. †

Cavalry will rarely find itself in a situation where it will have to charge a square. When it does, a broad front is requisite to compel the infantry to scatter its fire and to prevent the charging force from glancing off the square, a contingency that might easily arise if a narrow front were used. Units charging in narrow formation have almost invariably ridden past the square that they attempted to attack. Austrian cavalry at **Villafranca** in 1866. At **Wörth,** the wing of a charging body of French Cuirassiers carried away the corner of a square of pioneers.

The charge made by Cuirassiers of the French Guard at Vionville and that made by the first line of Gallifet's Brigade at Sedan, show that horses will break out of ranks when but a few strides from the infantry and will race

**Die Kavallerie als Schlachtenkörper.*

†The charge made by Pulz' Brigade at Custozza. The second line dropped back and followed the first line at a distance of 800 m. It arrived too late to prevent the rallying of the hostile infantry.

around the latter's flanks and then on. This breaking out of ranks can be guarded against only by the firm resolution of each trooper to break into the hostile ranks and by the cohesion of the unit. The pressure produced by keeping closed in on the center closes gaps at once, counteracts the involuntary breaking out of ranks of individual troopers and, in addition, assures, more than anything else, the maintenance of the direction once taken up toward the objective.

But, after it has broken into the infantry and has warded off hostile cavalry, the work of the cavalry is by no means done. It must strive toward mutual coöperation with the other troops of its own force. After cavalry has charged dismounted cavalry or mounted infantry, it has still to disperse the hostile led horses. Machine guns, which are capable of producing great havoc when turned against troops in close order, nowadays belong to the infantry. The attention of machine guns must be occupied, a weak force being used for this purpose, and they must be charged in flank and rear. (Pars. 113, and 451, German C. D. R.). Captured machine guns had best be brought off with their own teams. When they can not be carried off, they should be disabled or at least deprived of their mobility. The attention of infantry firing from a flank or of artillery must be occupied in the same manner, a weak force in extended order being used for this purpose. (Par. 447, German C.D. R.). A successful charge against infantry will frequently be followed by an attack against artillery.

### Provisions of Various Regulations.

**Austria:** The escadron charges in line or as foragers. No fixed attack formation is prescribed for the regiment. The attack formation that the regiment is to assume must be specified in each particular case, care being taken not to interfere with the action of friendly infantry and artillery. The regiment is formed either in one line, with normal or extended intervals between the escadrons, or in two lines. In the latter case, the escadrons in the first line are posted at intervals, those in the second following 150 to 225 m. directly in rear of those of the first or op-

PUBLIC PROPERTY



posite the intervals in that line. If a reserve is used, it follows 150—300 m. to the right or left rear of the second line. When deemed necessary the first line may be formed as foragers, and may cover a broader front than the following lines, which are to deliver the shock. The broad front of the first line keeps adjoining hostile infantry units that are not directly threatened by the charge, from concentrating their fire on the bodies of cavalry advancing in close order. The first line is to charge through the hostile infantry, make as much use as possible of its weapons and seek to advance beyond the hostile reserves. The following lines are formed of escadrons in close order, posted, as a rule, at considerable intervals. They are to charge the hostile infantry with energy, especially hostile infantry in close order, and to ride it down.

**France:** The regulations recommend that the shock delivered by several lines in close order, be prepared and supplemented by the coöperation of units in extended order. But the cavalry is to charge only when the results to be gained are commensurate with the losses to be expected. When infantry can be surprised while it is on the march, or is encountered in a condition of complete exhaustion, or when its attention and fire are occupied in another direction, the cavalry leader should not hesitate to charge. The French cavalry proposes to attack favorable objectives that it hopes to find on the flanks and in rear of the enemy, in order to facilitate the task of its infantry. Retreating hostile infantry is to be surrounded upon all sides in order to delay it and to make the most of every opportunity to inflict damage on the enemy. The cavalry is to throw itself recklessly upon victorious hostile infantry. Charges from all directions are preferred, the decisive blow being delivered, after the hostile infantry has deployed, from a direction from which the latter did not expect it to be made. According to the Cavalry Drill Regulations of 1908, a cavalry brigade is formed in four successive lines, each consisting of two escadrons, on a front of 600 m. The first and second lines are in single rank with 2 m. distance between them, the third and fourth in line of platoons in columns of fours with deploying intervals between platoons. Finally, one regiment is held out for delivering the decisive blow, and is posted some distance away from a flank of the preceding lines, flank protection being provided by echelons posted in rear of the flanks.

**Italy:** Covered avenues of approach are desirable, but, since opportune moments for charging are fleeting, it is not always practicable to seek such avenues. Therefore, it is generally advisable to choose the shortest route. Even infantry that is distributed in depth has less fire power toward a flank than toward the front.

A charge in extended order is to be made against thin skirmish lines only. When practicable, the charge is to be made in three echelons, each in close order. Of these, the leading echelon is the weakest. It is to move in close order and is to draw the enemy's fire upon itself and

to penetrate as far as possible into the hostile position. Each of the other echelons is to follow a short distance in rear of the preceding one, and to seek its own objective.

**Russia:** "In case it is impossible to surprise the enemy, it becomes necessary to provide distribution in depth and to bring up fresh troops in order to make good the great losses sustained by the first line and to reap the fruits of victory. The charges must follow one another so rapidly that the hostile infantry can not recover from its bewilderment. Larger units endeavor to combine front and flank attack, each attacking group being, in this case, formed in several lines. The coöperation of the horse artillery may be an advantage.

"Against infantry, the cavalry charges either in close or in extended order. In the latter case, the first line is in extended order, the second and third, on the other hand, are each in line, in close order. In larger cavalry units, if a fourth line is formed, it follows the others in line in close order, or in regimental or brigade column. The position of the second and third lines in rear of the first, is to assure the fulfillment of the conditions, above-mentioned, for the success of the charge against infantry. The second line is to follow 70 m., and the third 175 m. in rear of the first line.

"Dispositions for a charge are to be made so that there will be from three to six escadrons in the first line for every section of from 250 to 550 m. of the hostile fighting line.

"If the hostile infantry can not be approached under cover and the charge can not be made unexpectedly, the cavalry must, on open ground, form outside the zone of hostile infantry fire, if practicable at least two verst or more away from that infantry and cover that entire distance at the field gallop. This gait is to be increased progressively, the last 70—100 m. being covered at charging speed."

"The sections of the hostile line are designated by the commander of the first line. During the advance and before the charge proper begins, escadron commanders choose their own objectives, conforming, in so doing, to the base escadron.

"The first line charges through the hostile position; the second and third charge those parts of the enemy that were not struck by the first line or could not be defeated.

"Unshaken infantry that makes correct use of the ground, is almost equally strong in front and on the flank. But, in view of its greater readiness for repulsing a frontal charge and of the moral effect of attacks against flanks and rear, cavalry should always endeavor to charge against flanks and rear of hostile infantry. However, when this is impracticable, a combination of frontal attack with envelopment of the flanks is to be attempted.

"Selection of the proper moment for charging infantry is of the utmost importance. The following are considered suitable moments for charging infantry:

1. When there is a chance to surprise the hostile infantry unprepared to ward off the charge;

2. When the hostile infantry is in confusion or its morale is shaken by previous fighting.

"The last phases of an infantry action, in attack as well as in defense, may give cavalry a suitable opportunity for making a successful charge, because by that time the infantry units are generally mixed up more or less, considerable losses have occured among its leaders, and the nervous strain and physical exhaustion have reached their extreme limits."

## VI. CAVALRY VERSUS ARTILLERY.*

Temporary weakness and surprise of the artillery, impairing the effective use of its guns, are conditions precedent to the success of a cavalry charge against that arm. The long artillery columns with their echelons and trains, often but poorly protected, actually invite a cavalry charge. The charge made by the French cavalry during the battle of Culm (1813), against the Prussian artillery halted on the Dresden *chaussée*, shows to what dangers artillery is exposed in such situations. Unless other arms come to the rescue, artillery while in motion,† or while in the act of limbering or unlimbering, falls a sure prey to the cavalry. During the Franco-German war, enterprising cavalry would have been able to endanger the German artillery, which frequently hurried forward to the battlefield without adequate support.

The growth of the number of guns, the great road space taken up by artillery units in route column (4,800 m. of the total road space of 10,000 m. taken up by an infantry division), and the extent of the long artillery lines on the battlefield, enable cavalry to gain great successes. When the artillery has suffered heavy losses, when it is without support, and when there is a chance to surprise the firing batteries by taking them in flank or rear, or, when the ground is favorable, by advancing unexpectedly from nearby cover against their front, it will be easier for the cavalry to gain success. Batteries in a masked position can not, as a rule, keep the terrain in their immediate front under fire. From the front, artillery forms a material

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*Pars. 113, 174–176, 201, 224, 444–450, *German C. D. R.*

†The capture of a French battery by the 2d Escadron of the 11th Uhlans at Loigny, is a good example, both as regards conception and execution. KUNZ, *Reiterei*, p. 289.

obstacle on account of the position of its caisson bodies. It is difficult for artillery to change front after the spades of the pieces are once firmly imbedded in the ground. The most difficult change of front that can be undertaken by artillery is toward that flank on which the caisson bodies are posted. When the artillery is under hostile fire, a change of front that entails giving up the cover afforded by the caisson bodies, increases its losses. It is difficult for artillery to fire on cavalry approaching from the right or left, and besides, such fire is not very effective. When artillery is charged from the rear, its guns will frequently not be able to fire at all.

The most brilliant example of more recent times, is the charge made at **Tobitschau,** July 15th, 1866, by three escadrons of the 5th Prussian Cuirassiers, against Austrian artillery. While the two horse batteries of the division opened fire, and one platoon of Cuirassiers advanced against the hostile artillery so as to cover the flank of the movement, three escadrons crossed the Blatte brook in column of threes and, supported by the flanking platoon in front of the hostile artillery, charged by escadron along a depression against the flank of the hostile battery. The artillery discharged a few ineffective rounds of canister at short range; its support was dispersed; an escadron that hurried up was repulsed; and 18 guns, 15 limbers, and 7 caissons were taken and 2 officers, 168 men, and 157 horses captured. The Cuirassiers lost only 10 men.*

During the battle of **Orleans,** though the 1st Escadron of the 4th Prussian Hussars, after surprising French infantry, numbered only 65 sabers, it charged a French battery from the rear.

The battery did not have time to fire. The Hussars, who suffered no loss at all, captured and brought off 4 guns, 4 caissons, 4 officers, 75 men, and 79 horses.†

But the tactical situation may, on the other hand, require that cavalry be launched regardless of the cost, to silence artillery that is becoming annoying, or to divert its fire from important targets. (Par. 450, German C. D. R.). Examples from history are the charge of Cardigan's

*BESSER, *Preuszische Kavallerie*, 1866, p. 163. *Geschichte des Kuirassierregiments Nr. 5*, p. 80.

†KUNZ, *Reiterei*, p. 308.

Brigade at Balaklava, and that of Bredow's Brigade at Vionville.

If the artillery is protected by a body of other troops, the principal attack should, in the first place, be directed against the latter. When the artillery support has been defeated and perhaps thrown back upon the artillery, the latter will scarcely be in condition to repulse an energetic cavalry charge directed against its flank.

When cavalry can not surprise artillery by taking it in flank, and is forced to charge against front and flank, it must endeavor to have both attacks strike the enemy simultaneously, in order that the attacking bodies may not be defeated in detail. Aside from the probability of striking an artillery support, this has the advantage that it is more difficult for the artillery to fire upon the charging bodies. In order to divert the fire of the artillery as much as possible from the charging troops, weak bodies of cavalry should support this attack by advancing straight at the artillery in such a manner as to cover its entire front. Single-rank formations, followed at 300 m. by a few escadrons in close order, are especially suited for this work. In charging artillery in flank, the units that strike first should ride as far as possible along the artillery line in order to spread confusion over as large a portion of it as possible.

In making a frontal charge against artillery, cavalry forms in several lines, the first, in single rank, being followed at 300 m. by escadrons in close order. When it is impracticable to advance under cover, the gallop is taken up at an early moment and increased progressively as the objective is approached. A slower gait may be taken up in depressions that afford cover, in order that the horses may regain their breath. The first line is charged with the duty of riding through the battery and of repulsing any attempt to retake the guns; the second with the duty of breaking down the resistance in the battery itself by cutting down the gun squads. A third line turns against hostile cavalry, if any is present.

A battery is captured when it has been deprived of mobility, whether this condition results from carrying off the teams or from the fact that limbers and caissons drive off to safety. If the guns have to discontinue their fire—even if temporarily only—on account of lack of ammunition, this, in itself, is a great success for the cavalry. But even if this is the case, the battery is not yet taken; the resistance of the gun squads must first be broken quickly, and troops that attempt to recapture the guns must be repulsed. Therefore, to make the victory complete, and to enable the guns to be carried off, an adequate force must be pushed beyond the battery. It is generally a more difficult task to carry off or to disable the guns than to capture them, since all hostile troops in the vicinity will hasten up to recapture them. Military history shows that the instances in which cavalry lost the guns captured by it, are more numerous than those in which it succeeded in retaining permanent possession.

In 1865, the Prussian Ministry of War prescribed a method of using a saddle horse for draft purposes, the picket line being used like the American lasso. One end of the picket line was to be fastened to the upper part of the cincha, the other to the object to be drawn away. The horses pull well, as the rider's weight acts on back and ribs, but on long-legged horses the saddle is apt to slip. When so hitched, a horse is capable of pulling 5 cwt. even on soft ground. Hence it would take 5-6 horses to draw a French or a Russian field gun in this manner. It is, of course, necessary to draw the spade of the gun out of the ground. Horses hitched to the trail act as a brake. The Russian Cavalry Drill Regulations (1896) prescribe that harness for carrying off captured guns be improvised out of the hobbles and picket lines, the former being used to improvise a rude collar. Two horses are considered sufficient for each gun. It is better to use the teams belonging to the guns to carry them off. To cut down the

teams is therefore not so good a plan as to cut the drivers from their horses or to intimidate them. Guns may be disabled (pars. 99—101, German C. P. R. 1907) by detonating 3—5 explosive cartridges, if available, placed flat upon the muzzle or breech of the gun,* by removing the breechblock (weight about 17 kg.), or by destroying the brake and laying apparatus. French or Russian guns with screw breech mechanism may, in addition, be disabled by flattening the screw threads in the breech, and by destroying the fuse setters on the caisson bodies. The French guns may also be disabled by breaking off the metal at the muzzle. On the right side of the upper carriage there is a screw that closes the aperture through which the brake fluid may be drained. When this screw is removed, the valve in the interior may be destroyed by driving a pointed instrument into it, whereupon the brake fluid will flow out. Since the guns all carry a considerable number of spare parts, it does not suffice to damage the breechblock alone.

**a. Austria:** A small force suffices for fighting artillery itself; the bulk of the force must be used to repulse troops that may perhaps hurry up to protect the artillery. It is only when these troops are repulsed that the attack may be considered as having succeeded. Direct attack: First line as foragers, followed, if sufficient troops are available, by a few escadrons in close order and separated from each other by an interval of from 225 to 300 m. This formation is likewise a good one when the main attack is launched against a flank. In a flank attack against a long line of hostile artillery, distribution in depth is necessary. The first line must endeavor to ride quickly along the entire hostile line to the opposite flank; the following units must take possession of the guns. It is seldom possible to bring off the captured guns (*sic*). In order to take advantage of the element of surprise and to minimize losses, the attack should be made at top speed.

**b. Italy:** The regulations governing the attack against artillery are similar to those of Austria.

**c. France:** The regulations governing the attack against artillery are similar to those of Austria.

**d. Russia:** "In the frontal attack against artillery, the field gallop is taken up when the attacking line is at least two verst from the enemy, the charging gait being taken up when 110 m. from the batteries.

*Explosive cartridges are not very effective when applied to barrels of cast nickel-steel.

"The first line may operate either in extended or in close order. The other lines follow the first in line for the purpose of supporting it if effective artillery fire compels it to turn tail, or to ward off a charge made by hostile cavalry; in fine, to meet all possible contingencies that might arise in the course of the charge.

"The peculiarities of the formation and fire of artillery enable the first line to cover a broad front in extended order, and permit the other troops to form in rear of the first in shallow formation.

"In making dispositions for a charge against artillery, one to three escadrons should be placed in the first line for every six to eighteen guns in the hostile line.

"When the artillery is the principal objective, special bodies of troops should be detailed to attack the artillery support, the sections of the hostile infantry line nearest the artillery, as well as the hostile cavalry. In this case, the charge against sections of the hostile infantry line or that against the hostile cavalry, should precede that made against the artillery position.

"When one of the flanks of the artillery is not protected, or its supporting troops on that flank are not strong enough, it is desirable to direct the charge against that flank. It should not be forgotten that the launching of even a small body of troops against flank or rear of hostile artillery may facilitate the movement of all other attacking units and assure the success of the charge."

The heavy artillery of the field army usually fights at a considerable distance from its other troops, and, as a rule, in masked positions. On account of its slow rate of fire and the fact that it carries shell only, it falls an easier prey to cavalry than field artillery, which fights in close coöperation with infantry. But it should be borne in mind that heavy artillery is able to provide for its own security with the rifles with which its personnel is armed.

# THE
# FORMAL TACTICS
# OF
# FIELD ARTILLERY.

# THE TACTICS OF FIELD ARTILLERY.

## I. ARMAMENT, MOBILITY AND ORGANIZATION OF FIELD ARTILLERY.

### 1. DEVELOPMENT OF FIELD ARTILLERY SINCE THE FRANCO-GERMAN WAR.

After the campaign of 1870-71, the development of the field artillery of all European armies tended toward the introduction of a field gun having a flat trajectory and shrapnel effective against animate targets standing in the open. In Germany, lightness of matériel was sacrificed to increased effectiveness, and an attempt was made to facilitate the ammunition supply by adopting a single type of gun for field and horse batteries. Germany had, perhaps, made the greatest strides in perfecting shrapnel when the lessons derived from the battles around Plevna showed that shrapnel would produce no effect on an opponent in shelter trenches if its effectiveness against targets standing in the open was increased. The equipment of infantry with portable intrenching tools forcibly emphasized that greater attention should be paid to combating an enemy in shelter trenches. The hope that explosive shell would be effective against covered targets was not realized. This result was not obtained until the idea of a single type of gun was abandoned and the light 10.5 cm. field howitzer, model 1898 was adopted.*

The heavy field howitzer, originally attached to the

*After March, 1859, the artillery of a mobilized Prussian army corps consisted of three horse batteries, each armed with six 6-pounder guns and two 7-pounder howitzers; six foot batteries, each armed with eight 12-pounder guns; and three foot batteries, each armed with eight 7-pounder howitzers. Thus the artillery of an army corps numbered 30 howitzers and 60 guns. Cf. Lieutenant-General ROHNE'S article *Zur Feldhaubitzenfrage*, in *Artilleristische Monatshefte*, 1909, X, p. 276, *et seq.*

The French have adopted howitzers for the purpose of destroying material objects. The French consider the very curved trajectory of these guns a drawback that must be accepted as they would be much too heavy for field operations if given a flat trajectory. Cf. PALOQUE, *Artillerie de Campagne*, p. 205.

field army for the purpose of reducing barrier fortifications, was permanently assigned to the field army on account of the great effect of its projectiles against targets sheltered by overhead cover and shields. The transition to a rapid fire gun became possible only when smokeless powder was introduced. The introduction of the recoil barrel made it possible to provide shields for the cannoneers, who were no longer forced to step clear of the wheels as each shot was fired. This and not an increased rate of fire caused artillery tactics to enter upon an entirely new phase. Increased weight of matériel had to be accepted, as a reduction in caliber was inadvisable. The latter would have entailed a reduction of weight of the projectile.

Other things being equal, a heavy shrapnel is superior to a lighter projectile, both as regards effect produced and ease with which it can be observed. This superiority increases in proportion with the range and with the difficulty of determining the range accurately. The inferior effect of a single shot can be offset by increased expenditure of ammunition at short ranges only. The lighter guns have the advantage of a greater rate of fire, but this is outweighed by the drawback that the number of vehicles is increased. This results in a corresponding lengthening of route columns if as much ammunition is to be carried for the batteries as is required to attain an effect equal to that of batteries having heavier guns.

When recoil guns are once firmly fixed in position, relaying during the firing is superfluous. Hence these guns attain a high rate of fire, which is limited by the time required for setting fuzes, and for the barrel to recoil and to slide back into position. The recoil, in addition, considerably decreases the work of the cannoneers in that they are relieved of the fatiguing labor of running the carriage back into battery after each round. Losses suffered by the personnel are of little importance. While two men remain to serve the gun, it can fire as rapidily as before. The objections made to the recoil gun on the ground that it was too complicated and consequently not serviceable were unfounded. Even the danger of waste of ammunition is not great. The military history of the more distant past records more instances of bodies of troops and guns running out of ammunition, than that of the present day. If the ammuni-

tion fired has produced an effect, the object has been attained, and it is immaterial whether a certain number of rounds was fired in half an hour or in an hour, though the moral effect, which is frequently the deciding factor, is greater if the losses occur in a shorter period of time.

When the lower carriage is anchored by means of a trail spade or by the method used by the French, the gun becomes so firmly fixed in position during firing, that it is difficult, when a change of target becomes necessary, to move the trail quickly by hand so as to give the gun the proper direction. It is, therefore, feasible for small columns to make short flank movements at a rapid gait, provided the artillery has not been able beforehand to adjust its fire on the ground to be covered.

The objection made to gun shields, at the start, on the ground that they were disproportionately heavy and might make it easier for an enemy to pick up the position of the guns, were outweighed by the advantage of cover they afforded the cannoneers against shrapnel fire. The accuracy of the fire is bound to be increased when the gunner can do his work while completely sheltered. Sheet steel 3 mm. thick is penetrated neither by 8 mm. projectiles* at ranges over 400 m., nor by shrapnel bullets.

*The following is taken from *Artilleristische Monatshefte*, May number of 1909:

"During the street fighting in Constantinople in 1909, a battery was one night placed in position 500—600 m. from the barrack and a large quantity of ammunition was deposited beside the guns so that none of the personnel had to leave cover during the fight. In consequence of this precaution, and in spite of the heavy infantry fire, the battery lost but one non-commissioned officer, who was shot through the head while peering around the gun shield at the target. After the fight, 400 hits were counted on the shields. These hits were all caused by small arms bullets that had failed to penetrate the shields. The protection afforded by the Turkish 7.5 cm. shields is, indeed, excellent, as they have no semicircular opening in the rigid upper part, and as the oval aperture in the center of the shield, in which the barrel moves up and down, is completely covered by a funnel-shaped contrivance. This funnel caught a great many bullets that, in its absence, might perhaps have passed along the barrel and struck the cannoneers."

In a test held in Denmark in 1909, 270 shrapnel were fired at a range of 2,000 m. against a battery equipped with gun shields. The shields were frequently hit, but only five large fragments or unexploded projectiles penetrated them. But shrapnel that fails to function on hitting a shield bursts so far in rear of the gun that it produces no effect on the personnel at all. In the above mentioned case, six men of the personnel were disabled by nine hits, but not a single gun was placed out of action.

But it affords protection neither against large fragments, projectiles that penetrate without bursting, nor against 3.5 cm. shell. Shields 1.4—1.6 m. high weigh from 50—60 kg. Intact projectiles that strike a gun have little chance of dismounting it. The effect produced by such shots is, at best, problematical as shrapnel that fails to function when it strikes the shield, bursts about 1 m. in rear of the gun, though shell will, of course, produce some effect on the personnel.*

The difficulties encountered in fighting batteries provided with shields, lead to more extensive employment of curved fire guns and special projectiles (combination shrapnel-shell).†

But no matter what is done, one will never be able to produce so annihilating an effect on the personnel of a battery provided with shields as on that of one without shields. Therefore, one will always have to reckon with the possibility that when the infantry advances to the attack, single batteries or guns of the defender will again come into action and by their effective rapid fire force the advancing infantry to halt. Since it is impossible to demolish these batteries quickly, it has been proposed to cripple them by bursting a large number of smoke-producing projectiles in front and in rear of them, thus preventing them from training and adjusting their fire on the targets that are in motion. Colonel Ruffey of the French Army is of the opinion that this object will be attained if 16—20 projectiles per minute are burst in the vicinity of artillery that occupies a front of 100 m.

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*Lieutenant-General ROHNE (*Art. Monatshefte*, Sept. number 1907, p. 185, *et seq.*) computes that, at 3,000 m., 217 rounds (0.46%) would have to be fired in order to have one projectile strike a gun without bursting.

†Krupp's "shrapnel-shell" and Ehrhardt's "explosive shrapnel" are similar in that both produce essentially a shrapnel effect when burst by time fuze, and shell effect when burst by percussion fuze. That such a projectile, on striking a gun-shield, will produce a greater effect among the cannoneers of a shielded gun than an ordinary shrapnel that strikes a shield without bursting, is obvious. When the time fuze in the explosive shrapnel functions, it ignites the base charge; the combination fuze with the high explosive charge goes on and bursts on impact. The high explosive charge contains a smoke producing composition. This makes it possible to observe the point of impact of the fuze, lying as it does practically in prolongation of the trajectory, whereby data for possible future correction are obtained. See ROSKOTEN, *Die heutige Feldartillerie*, p. 167, *et seq.*

The field artillery of all the states that need be considered, is armed with a rapid-fire gun provided with shields (4—6 cm. thick) and capable, under peace conditions, of firing as many as twenty shots per minute. Its caliber varies from 7.5 to 8.38 cm. (Germany, 7.7; France, 7.5; Russia, 7.62; and England 8.38 cm., the last-named being an 18 pdr.). The German gun fires shrapnel weighing 6.85 kg. (the Russian, 6.5, and the French, 7.25 kg.) and high explosive shell of approximately the same weight, with an initial velocity of 465 m. (the Russian 588, and the French 530 m.). The projectiles are burst through the action of combination fuzes (in Germany graduated to 5,000, in France and Russia to 5,500 m.). The projectiles have a maximum range of 8,000 m. when percussion fuze is used. Canister has been replaced by shrapnel, which bursts approximately 200 m. in front of the gun when the fuse is set at zero. The German field artillery is also equipped with a light field howitzer, cal. 10.5 cm., which fires shrapnel weighing 12.8 kg. (time fuze ranging from 300 to 5,600 m.) and shell weighing 15.7 kg. (time fuze ranging from 500 to 5,600 m.). In the heavy artillery of the field army, the Germans use a heavy field howitzer, cal. 14.91 cm. firing shell that weighs 39.5 kg. and has an extreme range of 7,400 m., the French the Rimailho howitzer, and the English a 12.7 cm. howitzer and a 12 cm. gun.

Some of the states have adopted mountain guns for use in difficult country. When dismounted and carried on pack animals, these guns offer a smaller target than ordinary field artillery. They were used by the Japanese on the plains of Manchuria to accompany the infantry attack, and were found particularly useful for dismounting machine guns. Balloon guns, frequently transported on armored auto trucks,* are still in the experimental stage. Their projectiles are designed to tear the envelope of balloons or to ignite the gas therein contained.

*The balloon gun has a caliber of 5 cm. Total weight of gun and carriage including gun squad of five men, is 3,200 kg. Its extreme range is 7,800 m. At a range of 1,200 m., the maximum ordinate of its trajectory is 2,480 m. The balloon shrapnel weighs 2.4 kg.

**Table of Fire for German and French Field Guns.**

(Condensed from the table of fire computed by Lieut. Gen. Rohne).

Muzzle velocity, German gun: 465 m.; French gun, 530 m.

| Gun. | Range. m. | Angle of Elevation. degr. | Angle of Fall. degr. | Beaten zone for targets 1 m. high. m. | Velocity. m. | Remarks. |
|---|---|---|---|---|---|---|
| German.. | 1,000 | $1^{9}$* | $1^{13}$ | 32 | 369 | *The small figures denote sixteenths of a degree. |
| French.... | | $1^{3}$ | $1^{6}$ | 41 | 421 | |
| German.. | 2,000 | $3^{10}$ | $4^{12}$ | 12 | 310 | |
| French.... | | $2^{13}$ | $3^{12}$ | 15 | 344 | |
| German.. | 3,000 | $6^{4}$ | $8^{11}$ | 6.5 | 279 | |
| French.... | | $4^{2}$ | $6^{2}$ | 8 | 299 | |
| German.. | 4,000 | $9^{8}$ | $13^{8}$ | 4.2 | 256 | |
| French.... | | $7^{12}$ | $11^{10}$ | 4.9 | 274 | |
| German... | 5,000 | $13^{7}$ | $19^{7}$ | 2.8 | 237 | |
| French.... | | $11^{2}$ | $16^{11}$ | 3 | 256 | |
| German.. | 6,000 | $18^{3}$ | $26^{8}$ | 2.0 | 220 | |
| French.... | | $15^{4}$ | $22^{8}$ | 2 | 239 | |

The following are characteristic features of the new type of gun:

1. Increased effectiveness of the individual projectile, which, when it strikes any troops in the open within a range of 4,000 m., either quickly annihilates, or, at the very least, neutralizes them, i. e., robs them of unrestricted mobility.

2. Invulnerability of the personnel to losses, thanks to the introduction of shields.

3. The ability (of single batteries, at least), thanks to improved laying apparatus, of delivering fire from masked positions.

## 2. FLAT TRAJECTORY GUNS.

The principal projectile of field guns, model 96, is a base charge shrapnel provided with a combination time and percussion fuze. This shrapnel weighs 6.85 kg. and contains 300 bullets weighing 10 g. each. Its initial velocity is 465 m.

**Percussion Shrapnel** is used for defense at short range and in fire for adjustment; its effect depends upon the range and the nature of the ground. It is effective against troops lodged in tall timber. Masks, branches of trees, etc., frequently cause the premature burst of these projectiles.* On striking, the projectile cuts a furrow in the ground and bursts two to three meters beyond the point of impact.

**Percussion Shrapnel.**

Percussion shrapnel is effective only when bursting immediately in front of the target (5—25 m. in front of it, depending upon the range). However, even in this case, the bullets often pass over low targets, such as skirmishers lying down, and low parapets afford sufficient protection. An adequate effect can be obtained only when the fire is directed on standing targets. Soft ground, newly ploughed fields, terrain

*Engagement of Azay, January 6th, 1871. *Geschichte des Regiments Nr.* 20. HOFFBAUER, *Deutsche Artillerie*, I, pp. 16 and 48. *Taktik*, VI, p. 42.

covered with snow or underbrush, small folds of the ground, or a rising slope, diminish the fire effect.* When the angle of fall is 10 degrees or more (with the German piece at ranges of 3,300 m. and over), half of the bullets penetrate the ground, the remainder ricochet and pass on at a greatly reduced velocity. For this reason, percussion shell is more effective at the longer ranges than time shrapnel. Percussion shrapnel penetrates thin walls and shields and bursts beyond them. The explosive or incendiary effect of shrapnel is insignificant owing to the smallness of the bursting charge. However, some incendiary effect is possible if the projectile strikes an easily inflammable target.†

**Time Shrapnel** (used in Germany up to 5,000 m.) is fairly independent of the terrain, the burst being easily observed since the bullets are embedded in a "smoke-producing composition." It can, therefore, be used in fire for adjustment, provided the point of burst is low. The extreme range at which this projectile can be employed is fixed by the facility of observing the fire and by the remaining velocity of the shrapnel bullets, both of which diminish as the range increases. Field guns, model '96, may be effectively employed up to a range of 4,000 m.; under 3,000 m. their fire is very effective against targets in the open. The use of the combination fuze, on account of its certainty of burst, either by time or percussion, permits the trajectory to be accurately determined in every case. This fuze also makes it possible to employ shrapnel against rapidly advancing targets, and in warding off a sudden attack at short range. The French regulations give the width of the beaten zone of a single shrapnel as 20, that of two from the same piece as

*"When the ground at the target is uneven, for example newly ploughed soil, the effect of the fire is wholly a matter of chance. If, for example, the shell strikes the top of the ridge between two furrows, the effect is likely to be enhanced; but if, on the other hand, it strikes the base of such a ridge, the effect may be entirely nullified, since all the fragments propelled in direction of the objective bury themselves in the soil." (Lieutenant-General Rohne.)

†Consult *Taktik*, VI, p. 45, in regard to the incendiary effect of projectiles. The incendiary effect of the French *Obus Robin* is said to be greater, as the bullets are embedded in an explosive.

25 m. The maximum depth of the beaten zone is 300 m. The angle of the cone of dispersion of the German shrapnel, model '96, is 16 degrees at 2,000 m., that of the French shrapnel about 19 degrees.* Rearward lines of infantry are not safe from shrapnel fired at their first line unless they follow 300 to 400 m. in rear of that line. The German shrapnel gives very good results when set to burst 30 to 150 m. short of the target, the height of burst being regulated accordingly (approximatley ⅓ of the whole number of hundreds of meters of the range). At ranges under 1,500 m., an adequate fire effect may be expected, however, even when the fuze is set to burst the projectile 300 m. short of the target.

Shrapnel is most effective against prone skirmishers at ranges from 1,000 to 3,000 m. when burst 28 to 22 m. short and against standing skirmishers at the same ranges when burst 56 to 45 m. short.

**Effect of a Single Time Shrapnel of the German Field Gun.**

| TARGETS. | When firing at the targets named (1 skirmish figure per m.) with time shrapnel set to burst 50 m. short, the following *hits per shrapnel* may be expected after the adjustment has been effected: | | | | |
|---|---|---|---|---|---|
| | 500 m. | 1,000 m. | 2,000 m. | 3,000 m. | 4,000 m. |
| Skirmishers, standing | 18.4 | 14.2 | 12.0 | 11.0 | 10.0 |
| Skirmishers, kneeling | 10.6 | 8.2 | 6.9 | 6.3 | 5.8 |
| Skirmishers, prone | 6.4 | 4.9 | 4.1 | 3.8 | 3.5 |
| Head targets | 3.5 | 2.7 | 2.3 | 2.1 | 1.9 |

*The following is quoted from Lieutenant-General ROHNE's article in *Artilleristische Monatshefte*, April number 1909, p. 287: "The angle of fall of projectiles fired from the French gun is smaller, and the depth of their beaten zone is therefore greater. This is a distinct advantage when the points of burst lie low and the intervals of burst are considerable. The range at which the angle of fall will equal half of the angle of the cone of dispersion—and beyond which the depth of the beaten zone rapidly decreases—I estimate at about 3,200 m. in the German field gun, model '96, and at about 4,200 m. in the French 75 mm. gun. In the French gun, the angle of fall of projectiles increases more slowly, the angle of the cone of dispersion more rapidly, than in the German field gun, model '96."

**Effect per Minute.**

| TARGETS. | When firing at the targets named (1 skirmish figure per m.) with time shrapnel, mod. '96, set to burst 50—100 m. short, the following *hits per minute* may be expected on an average: | | | | |
|---|---|---|---|---|---|
| | 500 m. | 1,000 m. | 2,000 m. | 3,000 m. | 4,000 m. |
| Skirmishers, standing | 364 | 202 | 109 | 46 | 14 |
| Skirmishers, kneeling | 210 | 117 | 63 | 27 | 8 |
| Skirmishers, prone | 126 | 70 | 38 | 16 | 5 |
| Head Targets | 70 | 39 | 21 | 9 | 3 |

More than 80% of the men struck by fragments and bullets from shrapnel bursting within 100 m. are disabled. The penetration of shrapnel bullets is so great at ranges under 2,000 m., that when they strike bones or vital organs of horses, they produce instant incapacity for action. This is especially true when the interval of burst is 100 m. or less. The effect of shrapnel directed against batteries provided with shields is insignificant. Time shrapnel is the principal projectile employed by artillery against animate objects, provided these are not located immediately in rear of parapets, within tall timber, or under bomb proofs. This projectile is ineffective against such cover on account of the flatness of the trajectory and the sensitiveness of the fuze.

Shrapnel is supplemented by **shell*** filled with explosive charge, model '88, which has a great explosive effect at extreme ranges and in tall timber.

Percussion shell, on account of its very sensitive fuze, bursts on penetrating a shield, whereas shrapnel goes entirely through a shield and bursts about 1—2 m. in rear of it.

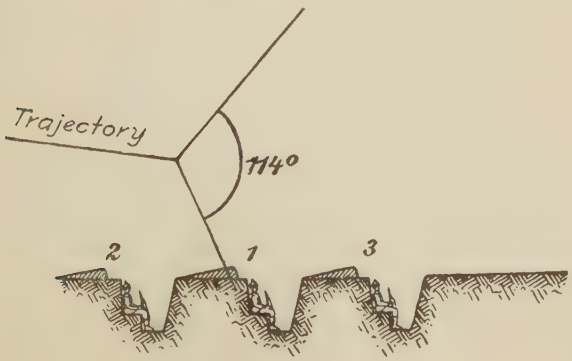
*During the Franco-German war the common shell used burst into 30, the double-walled shell into 76, and the ring shell into 150 fragments. These fragments did not have a satisfactory shape and weighed 13—14 g. each (i. e., about 21 fragments per kg.). v. MÜLLER, *Entwicklung der Feldartillerie*, III, p. 202.

**Percussion Shell, Model '96.**

Targets located immediately in rear of parapets or under light splinter proofs may be reached with time shell burst directly over or close in front of them. But even a slight increase in the interval of burst may nullify the effect. This was one reason why the effect of Japanese shells was not satisfactory in Manchuria.* The French *Obus allongé*, a high explosive percussion shell (melinite charge; angle of the cone of dispersion exceeds 100 degrees) is employed only for the destruction of material objects. Its fuze acts only after the projectile has pierced thin walls or shields, whereas the German shell bursts while penetrating such a target.

When firing on animate objects, the beaten zone of the French shell does not exceed a space 50 m. wide and 20 m. deep, but the concussion of the explosion will undoubtedly be felt at a greater distance. The explosive effect of the projectile is equivalent to that of 30 kg. of powder. The explosion of the projectile produces a cone-shaped crater having a diameter of 2 and a depth of 0.50 m. Ten melinite shells per running meter are required to destroy a parapet 3 m. thick and 2.30 m. high.

**Time Shell, Model '96.**




*V. TETTAU, *Achtzehn Monate*, I, p. 219.

Even very small fragments of the shell are capable of inflicting disabling wounds, provided the point of burst is appropriately situated (i. e., when the interval of burst is not too large and the point of burst not too high). Generally speaking, about 75% of all the wounds produced by shell, model '96, incapacitate for action. About 20 fragments may be reckoned to every kilogram of shell-weight, or 130—140 effective fragments for the projectile. Tests have developed the fact that three fragments (in shrapnel, model '96, about five) weigh 2 kg. These fragments are capable of penetrating steel plate 2 mm. thick. The angle of the cone of dispersion of shell, model '96, is about 114 degrees; the fragments number 500, of which only those weighing 10—20 g. are effective up to 50 m. distance from point of burst. The English regulations assume that the radius of effect of an explosive shell does not exceed 22 m.

The fragments are not evenly distributed. The central portion of the shell is very nearly empty, and, in consequence, an effect is not to be expected from any fragments but those at the base of the shell. The depth of the beaten zone does not exceed 50 m. even when the fire is directed against targets in the open. The large angle of the cone of dispersion makes it possible to strike targets located immediately in rear of parapets. The extreme angle of fall of shell fragments is 61 degrees at a range of 2,000 m., and 67 degrees at a range of 3,000. From this it follows that when fire is directed against targets immediately in rear of a parapet, an effect may be expected only when the points of burst are very accurately placed in the most advantageous position with reference to the target, i. e., immediately over or a little short of the interior crest. (In the above figure, only target 1 is struck, whereas, field howitzer shells burst over target 3 would not only strike that but target 1 as well.) This requires not only a very careful adjustment but great accuracy in the gun itself and uniformity in the fuzes. But, even under the most favorable conditions, the number of hits is small.

Shots striking the interior crest or within the work itself, may, under certain conditions, have a tremendous effect.

The number of effective shots will be still further reduced when it is impossible to adjust the fire accurately upon the target, and it becomes necessary to search an area by firing successive salvos, increasing or decreasing the range by 50 m. after each.* Even under favorable conditions, only a very small number of effective hits can be counted on when firing against covered targets. A great expenditure of ammunition must, therefore, be expected. In the Russo-Japanese war, such fire was, as a matter of fact, ineffective. In many instances, therefore, one will have to be satisfied with harrassing the occupants of the hostile trenches, unless one adopts the better plan of awaiting the moment when the hostile infantry is forced to man its parapets. For measures to be taken against shell fire, consult pars. 49–51, German F. A. D. R. Splinter proofs whose roofs have a slope of 12 degrees afford protection against projectiles from flat trajectory guns at ranges up to 3,000 m.

In **canister,** the contained bullets have a smaller initial velocity than the case. They richochet on striking. The range of these ricochets depends upon the character of the ground. Solid, level ground, or a gentle downward slope increase their range, whereas snow, sand, wet meadows, ploughed and cultivated land reduce their range. Since the introduction of smokeless powder, the range of canister has decreased, as this powder requires that the projectile close the barrel more tightly than canister is capable of doing. Of the ammunition carried by the smoothbore 12-pounder, C/42, 20% was canister, whose 6 oz. bullets were effective up to 800 m., the 3 oz. and 1½ oz. bullets up to 600 m. The small dispersion, the superficial direction, and flat trajectory of its individual bullets made canister very effective against standing targets at short ranges.

*Lieutenant-General Rohne computes that an interval of burst of 3.7 m. in the explosive shell, corresponds to one of 10.7 m. in the common shell, and to one of 50 m. in the shrapnel. To quote: "The number of hits is reduced by half when the interval of burst is doubled; that is to say, an interval of burst of 100 m. in the shrapnel corresponds to one of 7.4 m. in the explosive shell and to one of 20.4 m. in the common shell. According to par. 30, German F. A. F. Regulations, the shrapnel of the field gun is still effective when burst 150 m. short. This would correspond to 11.1 and 30.6 m. respectively, in common and explosive shell. Hence, an error of 25 m. in placing a shot impairs its effectiveness enormously if it is shell, little or not at all if it is shrapnel. For this reason, the shrapnel of the field gun can never be replaced by an explosive shell."

The simplicity and safety of handling it, the impossibility of using it at long ranges, and its effectiveness against targets at close range, justified its existence.* Its usefulness disappeared, however, as soon as it became possible to use shrapnel effectively at short range.

## 3. THE LIGHT FIELD HOWITZER AND THE HEAVY FIELD HOWITZER.

In direct and curved fire, the light field howitzer, model '98 (rigid mount with trail spade; no shields) heretofore fired shrapnel weighing 12.8 kg. (500 jacketed bullets, @ 10 g. each; time fuze graduated from 300 to 5,600 m.) and shell weighing 15.7 kg. (explosive charge, model '88; time fuze graduated from 500 to 5,600 m.). The new fixed ammunition, model 1905, for the field howitzer is burst by percussion at ranges over 600 m. only, time fuze being used at ranges under 600 m. As 40% of the projectiles carried are equipped with delay action fuzes, it is possible to utilize to the fullest extent the power of penetration of the projectile before it bursts. Howitzers are especially effective against batteries provided with shields.

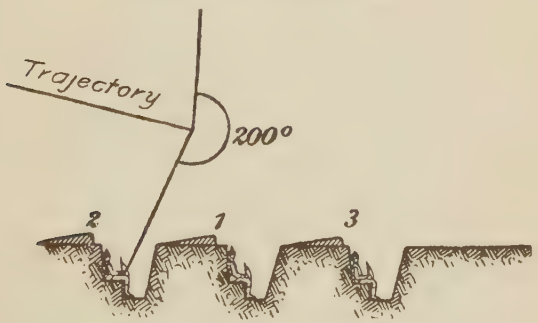
A single shrapnel from a light field howitzer produces a greater number of hits when the point of burst is favorably situated, than one fired from a field gun. However, the projectiles fired from the latter have a deeper beaten zone on account of the flatter trajectory of the piece, and a greater penetration owing to their greater remaining velocity. At the principal ranges, when the intervals of burst are moderate (30—150 m.), the effect produced by the two projectiles is the same. The effect of shrapnel from the field gun and from the light field howitzer is considered satisfactory at ranges under 1,500 m. when the intervals of burst are repsectively, 300 and 200 m. The superiority of shrapnel fired from a field gun is due to the greater penetration of its jacketed bullets, a result of greater velocity of the projectile itself at

*Sylvius' Battery repulsed an infantry attack at Wörth with five rounds of canister. HOFFBAUER, *Deutsche Artillerie*, II, pp. 57 and 123.

the point of burst. But, in this connection, it is to be borne in mind that only the effect of single shots is here considered. The shrapnel fire of the field gun is considerably superior to that of the howitzer. This is due to the fact that the howitzer fires more slowly than the field gun and must expend twice the weight of ammunition to produce the same results. If, in addition it is remembered that the field battery carries approximately two and one-half times as many shrapnel as the light field howitzer battery, it is obvious that the fire of the former will be two and one-half times as effective, against targets in the open, as that of the latter.

The superiority of the heavier projectile asserts itself when it becomes necessary to destroy material objects. Direct fire with time shell is employed against troops immediately behind cover. The shell is burst immediately in front of, over, or in rear of the target, which is thus struck by fragments from above. The more nearly perpendicular the fragments strike the target, and the greater their number and weight, the greater will be the effect produced.

**Time Shell, Model '98.**




Direct fire is used for adjustment, for effect against material objects, and against troops in the open. Percussion shell is used to reach targets under splinter proofs. In shell fitted with percussion fuze without delay action, the sensitiveness of the latter is so great that it acts at once

upon striking. Delay action fuzes ensure that the shells will penetrate before bursting. The angle of the cone of dispersion is about 200 degrees; with appropriate points of burst, fragments weighing 15 g. disable 80% of the men struck. In curved fire, at ranges beyond 2,100 m., shell with delay action fuze is capable of penetrating most of the splinter proof cover usually employed in the field. Lieutenant-General Rohne estimates that in firing under service conditions, only 3—4 of the 270 shells of a light field howitzer battery will penetrate overhead cover 3 m. thick. At ranges under 2,100 m., the angle of fall is too small to make adequate effect certain.

The largest angle at which fragments may fall from point of burst is equal to the angle of fall of the projectile plus one-half of the angle of the cone of dispersion. In the shell of the field gun, the angle of the cone of dispersion is about 114 degrees, in that of the light field howitzer, about 200 degrees. From this it follows that, at a range of 2,500 m., at which the angle of fall of the shell of the field gun is about 6 degrees, that of the shell of the light field howitzer, about 9 degrees, the fragments of the former will fall at angles up to 63 degrees, those of the latter at angles up to 109 degrees. Boards about 5 cm. thick afford adequate protection against the smaller fragments.

The **heavy field howitzer** fires percussion shell model, '04 (with or without delay action) weighing 39.5 kg. As this shell contains a large explosive charge, it is to be used, with delay action, to penetrate the roofs of splinter proofs. An earth covering 5—6 m. thick is necessary to afford protection against these projectiles. At 3,000 m., a 15 cm. shell produces a crater 1 m. deep and 2.4 to 3.6 m. in diameter, i. e., 2 cu. m. (in made ground this crater is three times this size.) Shell fragments have a considerable range (about 4,000 m.) and, when the projectile is fired without delay action, are especially effective against batteries provided with shields. Assuming their rates of fire to be the same and the conditions for adjustment equally favorable, the weight of metal thrown in a certain period of time at an objective by two heavy field howitzer batteries will approximately equal that so thrown

in the same time by five light field howitzer batteries. In this comparison, the superior penetration of the heavy shells is offset by the greater number of hits of the lighter shells.

It is, therefore, a good plan to use two heavy field howitzer batteries against a narrow front provided with especially strong overhead cover of the type used in the field, and five light field howitzer batteries against a broad front provided with ordinary overhead cover, splinter proofs, etc.

At **Montmédy,** a 21 cm. shell penetrated through an airshaft into a casemate and killed 6 and wounded 7—8 men.*

On January 20th, 1871, during the siege of **Belfort,** a 21 cm. shell entered Bastion No. 11 at a point where ammunition was stored and artillerymen were resting. A powder magazine blew up and 1 officer and 3 non-commissioned officers were disabled.†

On January 22d, 1871, during the attack on **Paris** from the north, a shell penetrated a bomb proof in a double crown work and disabled 13 men.‡

Captain von Limprun relates the following¶ in regard to the effect produced by a common shell that penetrated the bomb proof of battery No. 17 on January 8th, 1871, during the siege of **Paris:** "Heartrending groans issued from the bomb proof. A number of men came running out; only the mortally wounded and the dead remained inside. These groans and the constantly bursting shells produced a terrible effect. Three men were delirious and fought against being bandaged. They ran out of the battery and yelled commands; others prayed. By Heaven, it required iron nerves to keep cool. To transport the wounded was out of the question for the communications were too miserable and dangerous. The fragments of the heavy shells invariably tore and lacerated bodies in the most frightful manner. Formless shapes that once were human bodies often rolled with gruesome convulsions on the terreplein and on the emplacements, producing a worse impression on the men remaining unhurt than severe hostile fire. It was, therefore, of the utmost importance to remove the dead and wounded as quickly as possible from the battery." In another place, Lieutenant-General Müller states that after the war and until the early eighties, one officer, two non-commissioned officers (one of them a corporal decorated with the Iron Cross of the First Class) and four men of the company that had formed the garrison of this battery died in insane asylums.

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*v. MÜLLER, *Die Tätigkeit der deutschen Festungsartillerie bei den Belagerungen u. s. w. im Kriege 1870–71,* II. p. 353.

†*Ibid,* III, p. 172.

‡*Ibid,* IV, p. 222.

¶*Ibid,* IV, p. 162.

## THE EFFECT OF SHRAPNEL BULLETS ON ANIMATE TARGETS.*

During the Franco-German war, 8.4% of all serious wounds on the German side, and during the Russo-Japanese war, 15% of all serious wounds on each side, were caused by artillery fire.†

I. Shaho.

| Division | Wounds. | Wounds produced by artillery. | Percent. |
|---|---|---|---|
| Guards | 1715 | 176 | 10.26 |
| 2d | 2869 | 306 | 10.70 |
| 12th | 1604 | 333 | 20.19 |
| Total | 6188 | 815 | 13.75 |

II. Mukden.

| Division | Wounds | Wounds produced by artillery. | Percent. |
|---|---|---|---|
| Guards | 2851 | 347 | 12.17 |
| 2d | 4881 | 863 | 17.68 |
| 12th | 1778 | 284 | 15.97 |
| Total | 9510 | 1494 | 15.27 |

According to the above table, the least ratio of wounds produced by artillery to all others is 10%, the maximum, over 20%, and the average about 14.5%. Compare this with the statement of losses at Liaoyang in *Tactics*, I, KRUEGER'S translation, p. 167.

If the effect of shrapnel was unsatisfactory during the Russo-Japanese war, this was due to the fact that its very efficacy increased the desire for cover and that the artillery of the contestants scarcely ever dared to advance to close range.

*BIRCHER, Colonel and Corps Surgeon IId Swiss Army Corps: *Die Wirkung der Artilleriegeschosse.* Aarau, 1899.—KÜTTNER Kriegschirurgische *Erfahrungen aus dem Südafrikanischen Kriege 1900.* Tübingen, 1900.—HILDEBRAND, *Die Verwundungen durch die modernen Kriegsfeuerwaffen*, I, 1905.—ROHNE, *Über die Wirkung des Schrapnelschusses. Mil. Wochenblatt*, No. 74, 1902.—*Über die Artilleriewirkung im Ostasiatischen Kriege. Mil. Wochenblatt*, Nos. 84–86, 1908. *Art. Monatshefte* 1908, IX, p. 197.

†The following is taken from the article "*Statistics of losses during the Russo-Japanese and the Franco-German war*," appearing in *Vierteljahrshefte für Truppenführung und Heereskunde*, V, No. 1 (wounds on the killed are said to be included in the table):

The wounds produced by shrapnel bullets are similar to those caused by the lead bullets of the infantry weapons of the past. When the bullet strikes normally to the surface, it produces a wound circular at the point of impact and considerably enlarged at the point of exit; bones are frequently shattered; and the most serious effect is the introduction of foreign substances, such as pieces of cloth, particles of earth or sand, or of the material in which the bullets are embedded.

The effect of shrapnel bullets on animate targets depends upon the striking energy of the bullets (expressed by kgm.) and on their sectional density, those of smaller diameter having the greater penetration. The closer the point of burst is to the target, the greater the velocity, and, naturally, the effect.

Opinions differ as to the amount of "striking energy" necessary to put animate targets out of action. In France, an energy of at least 4.8 kgm. is considered necessary to disable human beings, and for horses an average of 19 kgm., whereas in Germany, an average energy of 8 kgm. is deemed sufficient. The 10 g. hardened lead bullet, having a diameter of 12.3 mm., retains this energy until its remaining velocity is only 120 m. This fixes the limit of effective shrapnel fire at 5,000 m., at which range its beaten zone is still 50 m. deep. At ranges up to 1,500 m., over 80% of the men struck by fragments and bullets from shrapnel bursting within 300 m. (and beyond this range, from shrapnel bursting within 150 m.) are put out of action. Artillery projectiles produce a relatively greater number of fatal wounds than infantry projectiles.

It is worthy of note that the packed knapsack affords protection against all shrapnel bullets having a velocity of 100 m. and against half of those having a velocity of 200 m. The overcoat roll stops shrapnel bullets having a velocity of less than 250 m. The penetration of these bullets is so great at ranges under 2,000 m., that when they strike bones or

vital organs of horses, they almost invariably produce instant incapacity for action. This is especially true when the interval of burst is 100 m. or less.

## 4. MOBILITY.

Experience has shown that in carriages intended to accompany rapidly moving columns on roads and across country, six-horse teams are the most economical, for an increase beyond this number does not produce a proportionate increase of draft power. Each near horse, moreover, expends a part of its energy in carrying a driver, and in consequence, a pair does only one and one-half times as much work as a single horse. In the early stages of a campaign, the fact that purchase horses are not accustomed to pull in a six-horse team will make itself noticeably felt when maneuvering over varied ground. Scharnhorst gives 250 kg. as the maximum draft power of a horse in a horse battery and 327 kg. as that of one in a field battery. This would amount to a total weight of 1,500 and 1,972 kg. respectively, in the two batteries under discussion, for a carriage, complete. These weights are at present exceeded in almost all guns and still more in caissons. The more effective a gun, the greater its weight. Effectiveness and mobility are conflicting factors that are not always easy to harmonize. The high muzzle velocity of the French field gun and the great weight of its projectile were obtained by sacrificing lightness of matériel and mobility.

In the artillery of the First Empire, the 12-pdr. weighing 1,880 kg. was abolished as too heavy. The heavy field gun, model '61, that was used during the Franco-German war weighed 1,835 kg., its caisson 1,965 kg., and the gun of the horse batteries 1,571 kg. In spite of its greater power, the field gun, model '96, is 13% lighter than the heavy field gun, model '61, whereas the present gun of the horse artillery is heavier.

At **Wörth,** the 4th Heavy Battery of the 11th German F. A., was for a time able to bring only four of its guns into position on the heights of Gunstett. On account of the rainsoaked ground, extra teams had to be

brought up to draw the guns up the slope.* The caissons of the three horse batteries of the same regiment were unable to accompany their guns until extra teams were provided.† The 5th Heavy Battery of the same regiment was for the moment, able to bring only three guns into position on the heights of Elsaszhausen.‡

The 1st Light Battery of the 5th German F. A. moved a considerable distance over the muddy roads of the Niederwald at the trot, during the battle of **Weiszenburg.** The resulting fatigue of its horses forced it to ascend the slope of the Geisberg at a walk and was the cause of its bringing only three of its guns into position.¶

**Relative marching powers of field and horse batteries.**

**Spicheren.** The Ist Heavy Battalion of the 7th German F. A. covered 40 km. in 3 hours, and the IId Heavy Battalion of the same regiment, 28 km. in 7 hours.§ The Horse Artillery Battalion of the 3d German F. A., after making a march during the morning, covered an additional 34 km. in 3 hours. Stöphasius' Field Battery of the same regiment covered 36 km. in 5¼ hours, and the other batteries of the regiment 36 km. n 6—7 hours. The roads, though good, involved steep grades. During the night following this march, a few purchase horses died of overexertion.

**Vionville.** The horse batteries of the IIId German Army Corps covered 10 km. in hilly country in 45 minutes on August 16th, 1870; the field batteries did not arrive until 45 minutes later.‖

On August 30th, 1870, the Horse Artillery Battalion of the German Guards and a brigade of Uhlans marched 14—16 English miles from Busancy at an uninterrupted trot, though the country was hilly and the column had to cross some bad stretches while passing by the 2d Infantry, Division. Though this trot was kept up for two and one-half hours touch with the cavalry was never lost. As soon as Sedan was reached, these batteries were able to go into position at once without difficulty, whereas the field batteries had to call upon the infantry for assistance.

At **Wörth,** the field batteries were likewise unable to keep up with the cavalry during the pursuit.°

On November 27th, 1870, during the movement toward the battlefield of **Amiens,** the 2d and 3d Horse Batteries of the 1st German F. A., which were attached to the corps artillery, made a march of 11 km., partly over muddy roads, in 40—50 minutes. During this march five infantrymen were carried on each gun carriage and six on each one of the other carriages. During the afternoon of the battle, these batteries while carrying the same load, made a flank march of 6 km., over rainsoaked and hilly ground, in 30 minutes. During the expedition against **Dieppe,** on

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*HOFFBAUER, *Deutsche Artillerie*, II, p. 45.

†*Ibid.*, p. 59.

‡*Ibid.*, p. 53.

¶*Ibid.*, I, p. 35.

§ *Kriegsgeschichtliche Einzelschriften*, II, p. 413.

‖HOHENLOHE, *Briefe über Artillerie*, pp. 85 and 207.

°KUNZ, *Reiterei*, p. 52.

January 13th, 1871, four guns of the 3d Horse Battery of the above mentioned regiment marched 86 km. between the hours of 6:30 A. M. and 12 o'clock midnight, though the ground was covered with a sheet of ice.

According to the French regulations, field batteries are to cover 8 km. and horse batteries 9 km. per hour. A halt of 10 minutes is to be made every two hours when the march does not exceed 35 km.

The weight of the heavy field howitzer, 2,600 kg., exceeds that of the caissons used during the Franco-German war.

Heavy artillery uses cold-blooded horses. Thoroughbreds were found unsuitable and were unable in the long run to do the work required of them on difficult terrain.

Experience teaches that on varied ground cold-blooded horses work better in harness than do thoroughbreds. The former do not overexert themselves so much as the latter when working in a team and when a difficult pull is encountered. In consequence, cold-blooded horses pull more steadily than thoroughbreds. Besides, their conformation enables cold-blooded horses to throw themselves into the harness with considerably greater weight than thoroughbreds and they are, consequently, better suited for draft purposes than the latter, which are better adapted for work under the saddle.

Cold-blooded horses likewise do quite well at the trot in level country, on roads, and on soil that is neither too sandy nor too muddy. They are able to cover 5—6 km. at the trot without material exertion. In deep mud and on very steep grades, cold-blooded horses should not be urged, for the expansion of which their hearts are capable is too slight for sudden exertion. Even on difficult ground, they work best when pulling steadily and slowly.

## 5. ARMAMENT WITH SMALL ARMS.

The difficulties confronting artillery personnel in warding off an enemy who has penetrated into a battery, the vulnerability of artillery on the march and in camp, and the danger of surprise when artillery is firing from a masked position, has led to arming the personnel with a carbine. In

the German artillery, all mounted men are armed with automatic pistol, model 1908* cannoneers with the former cavalry carbine, whose maximum range is 1,200 m. If the cannoneers were armed with a long range weapon, they would be tempted, during the excitement incident to a threatened attack at close range, to use their carbines, instead of trusting to the effect of the last available round of shrapnel. On the march, thorough reconnaissance and support of the other arms should protect the artillery against all danger. When the danger is great and the cavalry is too weak to furnish adequate protection to the artillery, infantrymen may be transported on limbers and caissons, so that they may be at hand the moment the guns unlimber.

The permanent assignment of special bodies as artillery supports, a practice followed, for example, in the Prussian army during the campaign of 1866, seems no longer advisable. When the French XVth Army Corps was organized a demi-company was permanently assigned to each battery as a support. The men of these demi-companies also received instruction in serving the piece.†

At **Beaumont,** each battery of the Bavarian 2d Division carried a section of Jägers and moved at the trot with this load for over two miles on the *chaussée.*‡ See also p. 237, *supra,* **Amiens.**

The men of a Bavarian battery, who were armed with Chassepot rifles, facilitated the limbering of their guns at **Coulmiers.**¶ At **Meung,** December 7th, 1870, the cannoneers of a French battery are said to have defended themselves with their *mousquetons,* until help arrived, against the Bavarian skirmishers that had penetrated into the battery.

**France:** Officers, non-commissioned officers, trumpeters, drivers and cannoneers of horse batteries are armed with the revolver and carry 18 rounds of ammunition each.

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*Its caliber is 9 mm. and its magazine holds 8 cartridges. Target practice is had up to a range of 75 m. only, and individual field practice up to 100 m. only. For unfavorable comment on the weapon, based on experience with it in China, see v. BINDER-KRIEGLSTEIN, *Die Kämpfe des Deutschen Expeditionskorps,* Berlin, 1902, p. 238.

†DES PALLIÈRES, *Campagne de 1870,* p. 40.

‡HOFFBAUER, *Deutsche Artillerie,* 7, p. 60.

¶According to CHANCY, *La deuxième armée de la Loire,* p. 116; HELLWIG, *Das I. bayrische Armeekorps,* p. 305.—*Gen. St. W.* III, p. 415.

Cannoneers of field batteries and the personnel of ammunition columns are armed with carbines (*mousquetons*) and knife bayonets. Each man carries 18 rounds of ammunition.

**Italy:** Officers, non-commissioned officers and trumpeters carry the revolver. For the immediate defense of a battery, the support of the other arms is required. A carbine (model '91) is carried by the personnel of ammunition columns and by that of mountain artillery only.

**Austria:** Officers, non-commissioned officers, trumpeters and cannoneers of horse batteries are armed with the revolver and carry 30 rounds of ammunition apiece. The cannoneers of field batteries and the personnel of trains and of ammunition columns are armed with a rifle (without bayonet) and each man carries 30 rounds of ammunition. The rifles of the drivers are carried on the carriages. Scouts are armed with the carbine.

**Russia:** Officers, non-commissioned officers and mounted men (scouts excepted) are armed with saber and revolver. Scouts are armed with the carbine. The personnel of ammunition columns is armed with the carbine. Cannoneers are armed with the *kinshal* (knife) and revolver.

**England:** There are 48 carbines in a battery. Drivers carry the revolver, but are not armed with the saber. The personnel of ammunition columns is armed with the carbine.

As heavy artillery fires generally from masked positions and as its long ammunition columns require special protection on the march, at a halt, and in action, its personnel is armed with the rifle (model '91). These rifles are to be used not only for defense at close range, but also to keep hostile patrols at a distance. Small arms practice in the heavy artillery is not designed to teach units how to conduct a fire fight, but aims to teach the individual and small bodies to handle the rifle properly. (Pars. 391 and 480, German Heavy Artillery Firing Regulations).* "Field firing is divided into individual practice (sentinels, operators, cyclists, observers) and collective practice, the latter being had by small or medium sized bodies."

*The men fire at ranges up to 200 m. only. The initial velocity of the rifle bullet is 570 m.

## 6. RELATIVE STRENGTH OF FIELD ARTILLERY TO OTHER ARMS.*

During the campaign of 1866 in Bohemia, the Prussians as well as the Austrians had 3.1 guns per 1,000 men of their total strength. At the battle of Königgrätz, the Prussians had 3.54 and the allied Austrians and Saxons 3.7 guns per 1,000 men of their total strength, and 5 and 5.5 guns, respectively, per 1,000 infantry. During the campaign of 1870, the French had 2.6 guns per 1,000 men, of their paper strength, but, in reality, 3.3 guns per 1,000 men, whereas the Germans had 2.3 and, at Sedan, 3.3 guns per 1,000 men.

At the outbreak of the Franco-German war, the IIId Army Corps of the German Army had 4.6 guns per 1,000 men and about the time of the battle of Le Mans, 5.8 guns per 1,000 men. At Vionville, the Xth Army Corps had 4.16, about the time of the capitulation of Metz, 5.8 guns per 1,000 men, and at Beaune la Rolande 6.4 guns per 1,000 men. The Ist Bavarian Army Corps had 8.8 guns per 1,000 men on December 3d, and 11.1 guns per 1,000 men on December 9th, 1870. At the present time, a German army corps has 5.76 guns per 1,000 infantry, and a German cavalry division 3.3 guns per 1,000 lances. In army corps of the same strength as the Ist Bavarian Corps on December 9th, 1870, this would amount to 40 artillery carriages, 15 guns. It would be inadvisable, therefore, to exceed these figures inasmuch as the horsed batteries of heavy artillery must also

*CLAUSEWITZ' remark that culminates with the words, "How much artillery can one have without inconvenience?" has, at present, an historical value only. But to quote—

"An excess of artillery is bound to cause operations to partake more and more of a defensive and passive character. One will seek salvation in strong positions, in formidable features of the terrain, and even in mountain positions, in order to shift the burden of defense and of protecting the numerous artillery onto the obstacles presented by the ground, so that hostile forces need only advance to be annihilated. War will be waged at a stately, formal pace, *á la minuet*.

"A shortage of artillery will, on the contrary, enable us to let the offensive, mobility and maneuvering predominate. Marches, hardships, exertions, will become peculiar weapons for us; war will become more diversified, more lively, more ruffled: great battles will be gained *quid pro quo*."

be reckoned with. If these batteries were included, the relative strength of artillery to other arms in an army corps would be increased to 6.4 guns per 1,000 men. The proportion of artillery to other arms has recently been fixed at 4.8 guns per 1,000 men in the French army, and at 5.9 guns per 1,000 men in the British army. In all other armies, the ratio that existed about the time of the Franco-German war still obtains. With crowding, the 144 guns of an army corps occupy a front of 2,500 m. (each battery a front of 104 m., including the interval to the next adjoining battery). The frontage that may be assigned to the several units grows apace with the increase in artillery. The amount of artillery that may be assigned to the several units is limited by the amount of protection that infantry can give artillery on the march and in action. Artillery should properly occupy road space not exceeding half the total depth of the column of which it forms a part. The road space of the artillery of a German army corps amounts to 9.5 km. (exclusive of field train), whereas that of the infantry (neglecting distances incidental to advance guard formation) amounts to 10 km. The artillery of a German division (total road space 10 km.) occupies 4,000 m. road space, and on the battlefield it occupies ⅓ to ½ of the total frontage of the division. The great depth of artillery columns and the danger that the deployment of the slower moving infantry will not keep pace with that of the artillery, undoubtedly constitute a difficult problem for the higher troop leader. This problem becomes more and more difficult as the effective strength of the infantry diminishes in the course of a campaign. A division whose battalions average 600 men, takes up a total road space of 7.5 km., of which the artillery takes up 4 km. How is the artillery to be adequately protected?

## 7. ORGANIZATION

Artillery, embracing as it does guns, teams, and personnel, is difficult to organize, but, in spite of this, is more easily raised than cavalry, as France's example during the Franco-German war proves. Skilled mechanics that would make good cannoneers are everywhere available in abundance, whereas trained riders are found in but few districts in sufficiently large numbers to enable a state quickly to create cavalry that is fit for service.

Of the 224 batteries belonging to the French army in 1870, only 59 remained after the capitulations of Metz and Sedan. Yet, the formation of new batteries did not offer insuperable difficulties. In Paris alone, 124 batteries were organized. From October 10th, 1870 to February 2d, 1871, the gun factories at Nantes turned out altogether 238 batteries with 1,428 guns, i. e., an average of one and one-half batteries per day. In all, 362 new batteries were created.*

Depending upon the purpose for which they are to be used, batteries may be divided into flat trajectory and curved fire batteries, field and mountain batteries. In order to simplify the ammunition supply, it is imperative that the number of calibers used be reduced to the minimum. For this reason, it would be desirable to abolish the light field howitzer.

Artillery is fit for action only when at a halt and unlimbered. Its maneuvering should, therefore, be cut down to the minimum and completed in the shortest possible time. Artillery remains longer under control of the leader than the other arms, and, even after suffering severe losses in men and horses, is again ready for action in a comparatively short time, always provided ammunition is available.†

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* *Historique de la 10 ème brigade de l'artillerie*, p. 25.

†Examples: Corps artillery of the IXth German Army Corps at Gravelotte. HOFFBAUER, *Deutsche Artillerie*, V. p, 58.—4th Field Battery, 4th German F. A. at Beaumont, *ibid.*, VII, pp. 44 and 86.

The very nature of the arm, its stability in action, would seem to justify increasing the frontage of a battery beyond the 100 paces laid down for the tactical unit of infantry and cavalry, the company and the escadron.* But it would be unwise materially to increase the number of guns and, consequently, the frontage of a battery, because the quantity of matériel, the number of horses and men involved in such an extension would make thorough supervision of the battery by a single individual impossible.

A gun with its team requires a space of from 16 to 20 paces for turning. This then fixes the minimum interval that may be left between guns. A further reduction of this interval is permissible only when the guns are not exposed to hostile fire. On a front of 100—150 paces, this would allow 6—8 guns to a battery. Since the beginning of the 19th Century, both the six and the eight-gun batteries have been represented in the field artilleries of various armies.

A battery should carry with it the ammunition that it will, in all probability, require on going into action and should possess the necessary means—both of personnel and matériel—to repair losses and damage. The German battery is divided into the firing battery, the combat train and the field train.

The six-gun battery has greater mobility than the eight-gun battery. The latter is unwieldy and directly invites splitting up. A Russian battery is commanded by a lieutenant-colonel and divided into two demi-batteries, each commanded by a captain. Thus, the Russian battery in reality constitutes a small battalion of two four-gun batteries. A battery acting alone is the exception. Hence, to arrive at the proper strength of a battery, it is necessary to decide whether the guns assigned to an army corps had best be formed into batteries of eight, six, or four guns. The eight-gun battery has the advantage of least unit cost, for, in forming twenty-four guns into eight-gun batteries, one six-

*See *Tactics*, I, KRUEGER's translation, p. 32.

gun or three four-gun batteries are saved. But, in order to keep the number of its carriages within reasonable bounds, the ammunition carried per piece must be reduced.*

With the adoption of the matériel of '96, such a high rate of fire had already been attained that in slow continuous fire some of the pieces were ready to fire before their turn came around again and thus served only as targets to the enemy. To obviate this defect and to develop the full power of a battery, recourse could still be had to fire at will. But, to adopt fire at will as the usual method of fire would make all fire direction impossible, not to mention the enormous amount of ammunition consumed. The objections made to increasing the artillery of an army corps from 84 to 90 guns (1870-71) and later to 144 guns, on the ground that there would not be room enough to bring all these guns into position in battle, are justified to a certain extent only, for modern weapons actually permit an extension of combat areas† and increased ranges make longer lines available.

Improvements made in the method of indirect laying enable artillery to use positions that were not to be thought of in the past. At any rate, it is better to have too many guns than too few, for an excess can, after all, be held in reserve. At Vionville, surely no one thought that we had too many guns.

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*The four-gun battery has been adopted by France, Switzerland, Sweden, Denmark, the United States, and by Austria (by the latter for horse and mountain artillery only).

Germany, Austria, England, Italy, Japan, Norway, Holland, and Belgium use the six-gun battery.

Russia uses the eight-gun battery.

†On August 18th, 1870, 3 batteries of the corps artillery of the VIIth German Army Corps were unable to go into action as there was no room for them. (Geschichte des F. A. R. Nr. 7, p. 248).—On the east front at Sedan, 19 batteries (belonging to the Guards, the IVth and XIIth Prussian, and to the Ist Bavarian Army Corps) were kept out of action on account of lack of room. A recent examination of the situation, however, brings to light the fact that the development of so large a force at this point, was inadvisable.—General von HOFFBAUER (*Altes und Neues aus der Feldartillerie*, p. 145), asserts that, out of 41 battles and engagements during the Campaign of 1870–71, there were but 7 battles in which lack of room prevented the artillery from bringing all of its guns into action. In the other 34 cases, lack of room did not become apparent.

With the adoption of recoil guns, the question of reducing the number of guns entered upon a new phase. Whereas the six field guns, model '73 fired only 15 rounds per minute, the four French field guns, model '97, fire 60—80 rounds in the same period. A numerical inferiority in guns may be compensated by accelerating the fire and, without loss of effect, the number of guns may be reduced in proportion as the rate of fire is increased. It is not the number of guns firing that is decisive, but the mass of projectiles that burst in the enemy's ranks. So long as the German artillery used nothing but obsolete matériel, the French could reasonably expect the 92 guns of their army corps to cope with the 144 guns of a German corps.

The high rate of fire of the modern gun requires that a correspondingly large amount of ammunition be kept at hand. During the Franco-German war, each gun had one caisson. The number of caissons was increased, upon the adoption of the matériel of 1873, to one and one-half caissons per gun. The French had three caissons per gun. One must, therefore, choose one of two alternatives, (1) To retain the present number of guns in a battery and to increase the number of caissons (in fine, burden the batteries with more carriages); or (2) To reduce the number of guns in a battery, slightly to increase the number of caissons, and to compensate for the discrepancy in guns by an accelerated rate of fire.

But, after all, everything depends upon the probable opponent. Until October 1st, 1899, the German army corps with its twenty-four 6-gun batteries having a total of 144 guns, had to reckon with the French army corps with its twenty-three 4-gun batteries having a total of 92 guns. During the summer of 1909, after extensive trials, the French increased the artillery of their corps to 144 guns, formed into thirty-six batteries. These batteries are distributed as follows: 9 batteries to each of the two divisions, 12 batteries corps artillery, and 6 batteries reserve brigade. Tests both

| | Peace Strength | | | | | War Strength | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Officers. | Enlisted Men. | Horses. | Guns. | Caissons. | Officers. | Enlisted Men. | Horses. | Carriages. | Guns. | Caissons. | No. of rounds in the battery. | No. of rounds per gun. |
| **Germany:*** | | | | | | | | | | | | | |
| Field Battery† | 4 | 115 | 63 | 6 | | 150 | | 130 | 16 | 6 | 6 | 780 | 130 |
| Horse Battery‡ | 5 | 121 | 120 | 6 | 2 | 170 | | 220 | 16 | 6 | 6 | 780 | 130 |
| Heavy Field Howitzer Btry | 4 | 144 | | | | 230 | | 120 | 18 | 4 | 8 | | |
| **Austria:** | | | | | | | | | | | | | |
| Field Battery | 4 | 100 | 50 | 4 | 2§ | about 150 | | 130 | 25 | 6 | 12 | 1314 | 219 |
| Horse Battery | 4 | 107 | 107 | 4 | 2§ | about 150 | | 220 | 14 | 4 | 4 | 504 | 126 |
| Heavy Field Howitzer Btry | 3 | 58 | 28 | 2 | —‖ | | | | | | | | 200 |
| **Italy:** | | | | | | | | | | | | | |
| Field Battery | 4 | 93 | 72 | 6 | | 4 | 152 | 122 | 16 | | | 1248 | 312 |
| Horse Battery | 4 | 69 | 107 | 6 | | 4 | 153 | 191 | 18 | | | | |
| **France:** | | | | | | | | | | | | | |
| Field Battery¶ | 3 | 90 | 57 | 4 | 2 | 4 | 173 | 167 | 18 | 4 | 12 | 1248 | 312 |
| Horse Battery° | 3 | 108 | 100 | 4 | 2 | 4 | 185 | 217 | 20 | 4 | 12 | 1248 | 312 |
| Heavy Field Howitzer Btry | 3 | 100 | 62 | 2 | ? | | | | | 2 | | | |
| **Russia:** | | | | | | | | | | | | | |
| Field Battery | 6 | 195 | 49 | | | 6 | 237 | 186 | | 8 | 16 | 2016 | 252 |
| Horse Battery | 5 | 186 | 186 | | | 5 | 197 | 248 | | 6 | 12 | 978 | 163 |
| Howitzer Battery | 5 | 193 | 6 | | | 5 | 173 | 167 | | | | | |
| **England:**[1] | | | | | | | | | | | | | |
| Field Battery | 5 | 127 | 60 | 4 | 2 | 5 | 198 | 180 | 21 | 6 | 12 | 1056 | 176 |
| Horse Battery | 5 | 149 | 94 | 4 | 2 | 5 | 196 | 220 | 21 | 6 | 12 | 1056 | 176 |
| Heavy Field Howitzer Btry. | | | | | | 5 | 185 | 156 | 18 | 6 | 9 | 540 | 90 |
| Heavy 60-pdr. Btry | | | | | | 5 | 182 | 151 | 19 | 4 | 12 | 400 | 100 |

*With reference to their strength, field batteries are classed as strong, medium, or weak; horse batteries, as strong or weak.

†These figures apply only to the 309 medium batteries. Each of the 211 weak batteries has 4 officers, 102 men, 48 horses and 4 guns. Each of the 12 strong batteries has 4 officers, 127 men, 75 horses, 6 guns, and 2 caissons.

‡These figures apply only to the 22 strong batteries. Each of the 20 weak batteries has 4 officers, 93 men, 76 horses and 4 guns.

§In addition, 1 telephone wagon, 1 escort wagon, and 2 ration wagons.

‖In addition, 1 store, 1 escort, and 1 ration wagon.

¶A strong field battery has 3 officers, 130 men, and 98 horses.

°A strong horse battery has 3 officers, 160 men, and 148 horses.

[1]. These figures apply only to batteries at minimum peace strength.

in Germany and in France furnished very good results as to the efficiency and usefulness of a 4-gun battery. Financial reasons and aversion to strike from the list guns already on hand, determined Germany to retain the 6-gun battery.*

At present, the question resolves itself into whether the guns of an army corps should be formed into 4-gun batteries or into 6-gun batteries. The advantages and disadvantages of the two types of batteries may be summed up as follows:

1. In the 4-gun battery, the difference between peace and war strength is less than in the 6-gun battery;

2. If the 6-gun battery is to develop a fire power equal to that of the 4-gun battery, the number of its caissons will have to be increased. This would very considerably overburden these batteries;†

3. The 6-gun battery can not use its full fire power to advantage. In continuous fire, two guns either stand ready for firing, but idle, as a reserve, or, if all fire, there is danger of the battery running out of ammunition. Including the ammunition carried for it in the light ammunition column, the German battery has 284 rounds available per gun, whereas the French battery has 312 rounds available per gun;

4. In the 4-gun battery, fire direction is easier than in the 6-gun battery. The greater mobility of the former is, above all, noticeable in horse batteries.

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*During the reorganization in 1899, General von Hoffbauer favored the 6-gun battery. But he admitted that if the French were to equip their army corps with thirty 4-gun batteries, these with their 120 guns would be superior to the 144 German guns formed into twenty-four batteries. Cf. v. HOFFBAUER, *Altes und Neues aus der deutschen Feldartillerie*, p. 158.—Attention is invited to the following essays by Lieutenant-General ROHNE: *Progress of Modern Field Artillery*, MACOMB'S translation; *Rückblick auf die Organisation der deutschen und französischen Feldartillerie* (*Jahrbücher für Armee u. Marine*, 1908); *Zur Reorganisation der französischen Feldartillerie* (January number *Artilleristische Monatshefte*, 1909); *Der Bericht der Militärkommission über die Reorganisation der französischen Artillerie* (July—December number *Artilleristische Monatshefte*, 1909).

†Two demi-batteries, each consisting of three guns, were tried out in France, but were found unsatisfactory, although each demi-battery developed, for a short time, the same fire power as a four-gun battery. August number *Artilleristische Monatshefte*, 1909.

The principal disadvantage of the 4-gun battery with its large ammunition supply consists of the increased burdening of the route columns. This defect may be obviated by marching on a broad front, and by more extensive employment of auto trucks. Another defect of this type of battery is that its fire power is at once impaired the moment one of its guns becomes disabled.

During the Franco-German war, the chief of artillery of a division was frequently unable to handle the divisional artillery (4 batteries) both tactically and technically. In consequence, the battalion organization frequently disappeared and artillery commanders were forced to put their artillery in piecemeal, by batteries, a procedure that made massed employment of the guns impossible. As the artillery force increased, a division and distribution of work became necessary. The regimental commander is now charged with the tactical, the battalion commanders generally with the purely technical conduct of the action.*

In Germany and France, battalions consist of three batteries. In action, such a battalion has a frontage of from 300 to 400 m. and can still be controlled by a single person. Moreover, it possesses greater mobility and takes up less road space than a 4-battery battalion and does not invite detaching batteries to the same extent as the latter. Battalions of two batteries, as used in Austria, are not strong enough to deserve the appellation "battalion." Since the adoption of 3-battery battalions and light ammunition columns, the employment of artillery by battalions has become the rule, the use of batteries alone, the exception.† As light ammunition columns are closely allied to the batteries, the personnel of the former can get some training at the piece after mobilization. A **regiment** consists of two battalions and a **brigade** of two regiments. No valid objection can

*In Russia, the commander of the artillery is charged only with the purely technical handling of the arm.

†The Italian regulations call the battery the combat unit, the battalion (of four batteries) the tactical unit.

be urged against this two-unit organization, as the simultaneous employment of a large number of guns—not a successive employment—is based on the characteristics of the arm. A division should have the artillery necessary to enable it to fight any target that might appear. Hence, in addition to its light field guns, the division should have a number of batteries capable of employing curved as well as direct fire. These requirements are fulfilled by the light field howitzer.

The batteries of the heavy artillery of the field army have four guns each. Two mortar batteries, or four howitzer batteries with a light ammunition column form a battalion. At the present time, this is all the artillery that is attached, for road spaces are already considerably increased by the addition of ammunition columns.

## ASSIGNMENT OF ARTILLERY TO HIGHER UNITS.

In Germany, Austria and Russia, the artillery is distributed equally among all the divisions, whereas, in France and Italy corps artillery is still used.

**Germany:** The artillery of an infantry division consists of a field artillery brigade of two regiments, each composed of six batteries. One light field howitzer battalion of three batteries is assigned to one of the divisions of each army corps in lieu of a battalion of field guns. The artillery of an army corps consists of 144 guns. A heavy field howitzer battalion of four batteries, each composed of four heavy field howitzers, is attached to each army corps.

**Austria:** The artillery of an army corps of three divisions consists of a field artillery brigade of three light field artillery regiments and of one howitzer regiment. Each artillery regiment consists of two battalions (called divisions), and each battalion of two batteries. The artillery of an infantry division consists of two battalions, one composed of two field batteries, the other of two field howitzer batteries. The assignment of a heavy howitzer battalion of three batteries to each corps, as corps artillery appears to be contemplated.

**Italy:** The artillery of a division consists of a demi-regiment comprising two field batteries and two howitzer batteries (10.5 cm. howitzers). The corps artillery of an army corps consists of two battalions of three field batteries each, and of one light field howitzer battalion of two batteries, in all sixteen batteries with a total of 96 guns.

**France:** The artillery of a division consists of one regiment of nine batteries. An army corps has, in addition, corps artillery consisting of four battalions (12 batteries). To this must be added, two battalions of reserve artillery, and two new Rimailho batteries, each composed of two 155 mm. howitzers. The whole artillery force of an army corps, therefore, consists of 144+4 guns.

**Russia:** The artillery of one division of an army corps consists of two battalions, each of three batteries, a total of 48 guns, that of the other division of one brigade of two battalions of three batteries each, and of one battalion of two batteries. An army corps has 112 guns available.

**England:** The field army consists of six infantry divisions and auxiliary troops. The divisional artillery consists of three battalions of field artillery of three batteries each, and a light ammunition column, of one howitzer battalion of two batteries and a light ammunition column, and of one battery of heavy guns (4 guns and light ammunition column), in all 70 guns.

Starting with the assumption that combats by independent divisions and army corps will be the exception and that all organization must be based on the supposition that the decisive battle will be fought by armies, we may assume that, in attack, an army corps consisting of from twenty-four to thirty battalions, will have a frontage of 5,000 m. On varied ground, it will almost invariably be practicable to put 140—160 guns into position. If, in addition to these considerations, and bearing in mind the probable opponent and the probable theater of war, one believes that a modern army corps should have from five to six guns per 1,000 men, these guns will take up all the available room in the battle line. It will be impossible for lack of room, therefore, to reinforce a part of the line by putting in reserve, corps, or army artillery, unless intervals between guns are decreased, an expedient that would be sure to increase losses.

An army corps acting independently is differently situated, for it is less hampered as regards its frontage. But, in an army corps acting alone, it will often be necessary to reinforce the artillery of one of the divisions while depleting that of the other. If corps artillery is available, this requirement may be met by placing it in position at the de-

cisive point. According to its advocates, corps artillery is to enable the general commanding a corps of two divisions, to influence the battle in any manner that he may consider requisite. "Such a mass of guns will quickly make itself felt. Wherever it appears and prepares the attack, infantry will involuntarily congregate. The line occupied by this artillery will fix the front of the entire army corps."*

But this artillery reserve alone does not suffice. The corps commander unquestionably requires, in addition, an infantry reserve. This he takes from the division that is not as yet to be launched into decisive action and whose advance he wishes to retard.

It would appear to be better, therefore, to attach to an army corps a third battle unit, composed of all arms. This unit would then obviate the necessity of corps artillery. To comply strictly with the principle that an army corps in route column must not be so long that it can not deploy for action in one day, would mean a reduction of the strength of infantry battalions, if the army corps consisted of three divisions. In practice, however, it is not a good plan to make this reduction, since it is almost always practicable to march on a broader front than in column of squads, or at least on two roads, and since the strength of battalions invariably decreases rapidly in the course of a campaign. The objections made to adding a third division to an army corps, on the ground that this would unduly increase the road space taken up by a corps, are tenable in theory only. If

*v.d. GOLTZ, *Volk in Waffen*, p. 38.

v. *Schlichting, Taktische u. strategische Grundsätze der Gegenwart*, III, p. 51. "Whether corps artillery should be retained or not depends upon the general situation. Corps artillery is necessary when it becomes desirable to reinforce the artillery line. Corps artillery is to bring about the decision in the artillery combat, to assure it in attack and to ward it off in defense. The corps artillery may be launched by the corps commander only. Corps artillery constitutes a link between the two divisions that can not be formed at the very last moment out of the divisional artillery, for it would then be too late and would cripple the division, as it is not a question of forming a reserve but one of throwing a strong artillery force into position as soon as possible. But, if this is recognized as necessary at all, it is unquestionably better to form corps artillery at the very start than to create it for a particular contingency by breaking up other units." v. SCHELL, *Studien über Taktik der Feldartillerie*, 1882.

it is considered undesirable to disturb the organization based on the two-unit system, nothing remains but to attach reserve divisions to the army corps. But, unless large peace *cadres* are available, these reserve divisions will scarcely be on a par, during the early stages of the campaign, with regular divisions.

One question is important, viz., will the deployment of the artillery be retarded in a rencontre, by the formation of corps artillery, and will the latter be the cause that the bulk of the artillery is not employed at the decisive point?

When an army corps marches in two columns, a disposition certainly to be desired, it will be an advantage in case of an unexpected encounter with the enemy, if the artillery is equally divided between the two columns, since one can rarely tell beforehand which of the two columns should be made the stronger in artillery. Such a division of the artillery becomes a necessity when the two columns are marching along widely separated roads and when unfavorable intervening ground increases the difficulties of transferring the artillery from one column to the other. The advantages that were expected to accrue from corps artillery materialized in scarcely any of the engagements of the Franco-German war. Scarcely a single instance can be cited where a corps commander exercised a decisive influence on the course of a battle by putting in his corps artillery or wherethe employment of the divisional artillery would have been materially different.

On August 6th, 1870, during the advance toward the Saar, it would have been advantageous if the corps artillery of the VIIth German Army Corps had been equally divided between the two divisions. The VIIth Army Corps advanced in two columns that were separated from each other by 13 km. and the intervening terrain made all communication difficult. The corps artillery marched with the right column. The timely arrival of the corps artillery at Forbach—and this could have been managed easily—would have been most desirable, especially if the divisions of Bazaine's corps had hurried to the battlefield.

At **Colombey,** the corps artillery of the Ist German Army Corps was assigned to the left column with orders to support the advance guard of the

VIIth Army Corps, and, in consequence, it was absent from the right column when the hostile envelopment made itself felt.

The assignment of the corps artillery of the IIId Army Corps to the left column (6th Division) on August 16th, 1870 (battle of **Vionville**), has been cited as proof of the harmfulness of having corps artillery, because it could have been employed to better advantage with the 5th Division, whose artillery force proved inadequate. Critics overlook the fact that the batteries would have been delayed by crossing the chain bridge at Corny, and that, on the other hand, transfers of artillery from the 6th to the 5th Division would have been facilitated if good lateral communications had been available. So, although reinforced by Lyncker's Detachment, the 5th Division did not receive effective support until the corps artillery went into action in the section assigned to the 6th Division. It would have been better if, instead of halting as it did at Onville, the corps artillery had concentrated with the 6th Division at Buxières.

It is a good plan for a large force acting on the defensive, to retain an artillery reserve. Such a reserve enables the commander—as at Noisseville—to employ the bulk of his artillery according to necessity as the hostile main attack develops. The disintegration of the artillery reserve at Coulmiers was due to the fact that the defensive position selected was too extensive to be held by the weak infantry force available. But even in this case, it would have been better to hold the artillery reserve intact.

In favor of assigning all the artillery to the divisions* (Russia, Austria, Germany), it may be urged,—

1. That, nowadays, war is not carried on by means of army corps acting independently, but by armies operating abreast of each other;

2. That such assignment facilitates the timely deployment of the artillery which modern battle demands;

3. That, whereas the creation of corps artillery in certain corps may be necessary at times in defense, and occasionally desirable in a battle fought according to a preconceived plan, it may be a distinct disadvantage in a rencontre;

4. That such assignment facilitates command and simplifies the problems of shelter and supply;

*For reasons for abolishing corps artillery, see MÜLLER, *Entwicklung der Feldartillerie*, III, p. 282; *Loebell's Jahresberichte*, 1898, p. 752; *ibid.*, 1890, p. 329, *ibid.*, 1891, p. 369; *ibid.*, 1892, p. 285; *ibid.*, 1893, p. 343; *ibid.*, 1895, p. 355; and *Militär-Wochenblatt*, 1890, Nos. 44 and 45; *ibid.*, 1899, Nos. 58, 59 and 61.

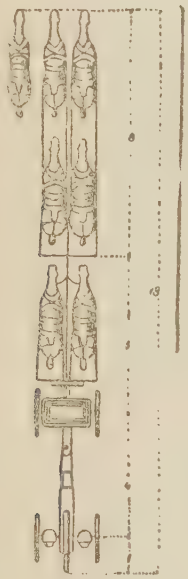
5. That it brings about closer relations between artillery and infantry in time of peace.

The desirability of permanently assigning all of the artillery to the divisions follows from the foregoing. Now, whereas light field batteries should quickly go into position at the very beginning of an attack, curved fire batteries should be held back until the situation is clear. But, since any army corps may encounter a fortified position that can be made so strong by six hours of labor that the fire power of light field artillery alone will not suffice, it is desirable, from a tactical point of view, to assign howitzer batteries to army corps. When engaged with batteries provided with shields, an increase of fire power will, likewise, be welcomed in a rencontre. Since these batteries are capable of firing from masked positions and over the heads of other troops and batteries, and since a collective effect is imperatively necessary, it is advisable to keep these batteries together in one body within the army corps and to use them together after the manner of an "artillery reserve" as soon as the information requisite for their employment has been obtained. *In the large armies of today, the existence of corps artillery is justified only when it consists of curved fire batteries.*

## II. THE FORMATIONS.

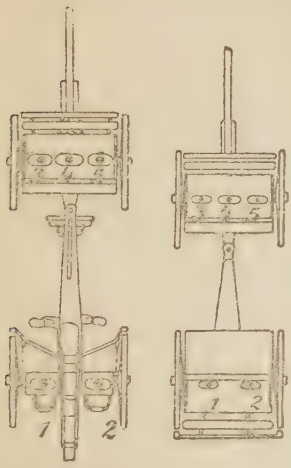
### 1. THE PIECE.

"Good artillery needs only a few simple formations, but these it should know thoroughly. It should be able to use them to the best advantage in any situation and while going at a fast gait, without becoming committed to a stereotyped course of action, all of its elements, at the same time, mutually supporting each other. If artillery can do this, if it can make long marches, post its guns quickly in any and all situations, fire coolly and effectively, and knows how to make the best tactical use of its fire, it will be equal to its task in action. It would be unseemly for artillery to indulge in exhibitions and ceremonies, and not consonant with the serious duties that it has to perform. In everything that it does and practices, artillery should be animated by the consciousness that direct preparation for the critical time of action is the essential thing. What artillery has learned in time of peace, it will be able to put into practice in war; what it has neglected, it will lack at the critical moment." (Austrian Drill Regulations of 1909 for Field and Heavy Artillery).




Each gun has its own caisson. One chief of section and five cannoneers constitute the gun squad and five cannoneers (in a horse battery, three) the caisson squad. In a horse battery there are, in addition, two horse holders for each

piece and one for each caisson. In a field battery, two cannoneers are mounted on the axle seats and three on the limber chest of each gun carriage. On route marches, cannoneers may march either beside or in rear of their carriages.



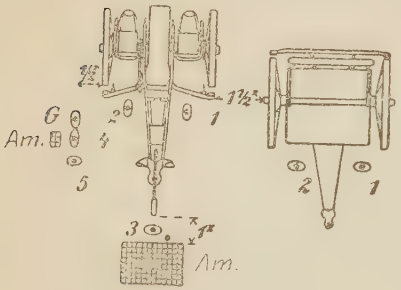

The chief of section is habitually posted boot to boot with the lead driver of his piece. In a field battery, the cannoneers are, as a general rule, mounted on the carriages. They march on foot, when ordered to do so, on route marches, on bad roads, on steep grades, and when obstacles are encountered, in order to lighten the load or to assist the teams. The length of a field gun with its team is 19 paces (15 m.), that of a field howitzer, 18 paces (14 m.). In a horse battery, the cannoneers of each piece are formed in double rank with one pace distance between ranks, and posted either at close distance (2 paces) or full distance (6 paces) in rear of their piece. Full distance is used only when the battery is advancing in the order in line (from which the order in battery is usually taken up) in order to enable the cannoneers to dismount quickly and to prevent their running into the pieces when checks occur or the battery is brought to a halt from the trot or the gallop. On route marches, cannoneers may ride on both sides of their carriages or in column of twos in rear of their carriages. The road space of a horse artillery gun is 28 paces at close distance and 32 paces (25.6 m.) at full distance. In France, cannoneers are posted one meter in rear of their pieces, with one meter between ranks.

In the order in battery, one caisson body is posted one-half pace to the right, and slightly to the rear of each field gun, and one and one-half paces to the right and slightly to the rear of each howitzer. In France, caisson bodies stand 0.5 m. to the left of their pieces, axles on the same line.

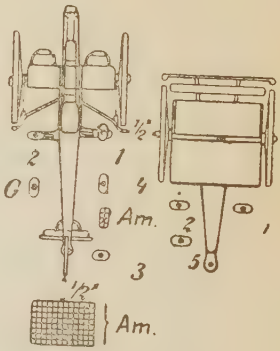
The gun squads of field batteries are protected by the gun shields, but cannoneers of light field howitzer batteries have to step clear of the wheels at each shot.

## Germany.

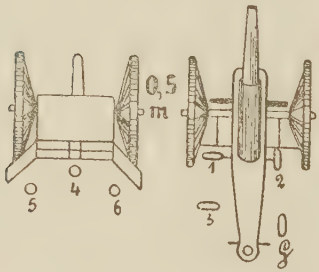
**Field Howitzer.**



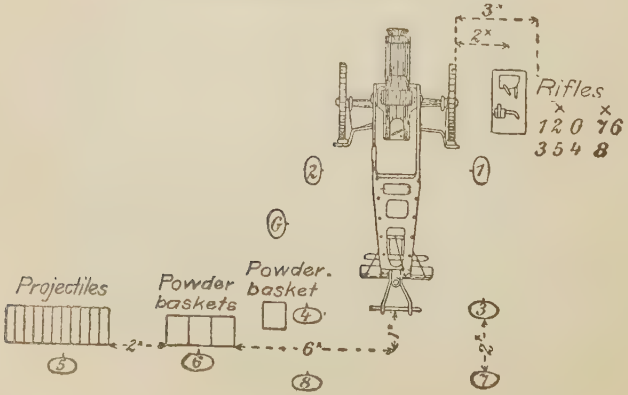

**Field Gun.**




## France.




**Heavy Field Howitzer.**



## 2. GAITS.

As artillery can fire only when halted, the time consumed in changing position should be cut down to the minimum. Since batteries will have to move forward from their places in column in order to go into position, it is essential that they be able to cover considerable distances over varied ground at the trot. A slower trot than that ordinarily used may be taken up when the column is long. The teams must bring their guns into position, if it kills them.

### Rate of March per Minute.

| | Walk | | Trot | | Gallop | | Accelerated Gallop | |
|---|---|---|---|---|---|---|---|---|
| | paces. | m. | paces | m. | paces | m. | paces | m. |
| Germany | 125 | 100 | 275 | 220 | 500 | 400 | 700 | 560 |
| Austria | 125–130 | 94 | 300 | 200 | 500 | 375 | | |
| France | | 100 | | 200 | | 340 | | 440 |
| Italy | | 100 | | 200<br>Fast trot up to 280 | | 380 | | 450 |
| England | | 106 | | 214 | | 400 | | |
| Russia | | 89<br>Horse Btry (slow) 108 | | 212 in exceptnl circ. 226 | | 427<br>Horse Btrs. only. | | 425 |

### Rates of March.

**France:** When marching alone, field artillery covers 8 (horse artillery 9) km. per hour, and from 30 to 40 (horse artillery 40) km. per day, without requiring extended rest.

**Italy:** Field artillery covers from 5 to 8 km. per hour and from 30 to 40 km. per day. In a forced march, it is expected to cover 80 km. in one day.

**Austria:** Large bodies of artillery are expected to make 15 km., and small bodies 23 km. per day. In a forced march, artillery when part of an infantry column, is expected to cover 45 km. per day, and when it is

part of a cavalry column, 60 km. per day. In movements that take some time to execute, artillery is to move at the trot, covering 200 m. per minute. Artillery marching alone is to move at the trot and walk; within the zone of battle, it is to move at the trot. The gallop is to be used in exceptional cases, and then only on favorable ground. Trotting uphill is to be avoided. Horse batteries are not to trot for longer periods than 20 minutes, and field batteries are to use the gallop only when they are in line at full intervals and this gait is not to be kept up for more than 500 m.

**Russia:** The regulations prescribe that artillery is to cover 5—6 km. per hour at the walk and 7—9 km. per hour at the trot. Field artillery, marching alone, is to cover 32 km. in $5\frac{1}{2}$ hours; horse artillery as much as 60 km. Mixed commands are expected to cover, without undue exertion, 30 km. in $7\frac{1}{2}$ — 9 hours, but this is the maximum.

"The **gallop** is incompatible with steady pulling, as the horses invariably throw their weight into the collar with a jerk and never move forward together. In spite of this and the fact that our field batteries could, unquestionably, get along just as well without the gallop in war as the French field batteries, which scarcely use it, no doubt, most artillerymen are in favor of retaining the gallop. The gallop increases the skill of the drivers, steels their nerves and teaches them to watch for signals and commands even in the most critical situations. A battery that can maneuver well at the gallop, will assuredly march better at the trot over difficult ground, than one whose drivers have not learned to keep their eyes and ears open even moving at the gallop. On a good *chaussée*, a steady gallop in route column does not impair cohesion. But to form line at a wild gallop and to halt abruptly preparatory to unlimbering, or, worse yet, to gallop for twenty paces during a change of front executed in line, does impair cohesion." The gallop is useful in crossing difficult places and in bringing up guns that have dropped behind.

## 3. THE BATTERY.

The order in line* and the order in line at close intervals (pars. 293 and 298–304, German F. A. D. R.) differ from each other in that in the latter the interval between guns is five paces, in the former twenty paces, measured, in either case, from the center of one carriage to the center of the next in line. The order in line has the following important advantages:

*It is to be understood that whenever this term appears without qualification, **line at full intervals** is meant.—*Translator.*

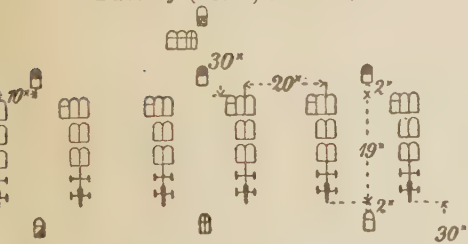
# Germany.

## Field, Field Howitzer, or Horse Battery.

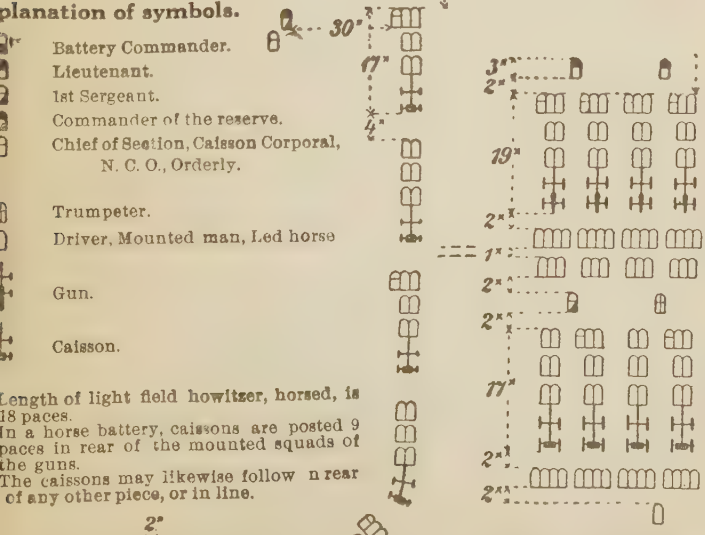
**Organization.**

- **Firing Battery**
  - 1st Piece, 2d Piece — 1st Platoon
  - 3d Piece, 4th Piece — 2d Platoon
  - 5th Piece, 6th Piece — 3d Platoon
  - 1st Caisson, 2d Caisson — 1st Caisson Platoon
  - 3d Caisson, 4th Caisson — 2d Caisson Platoon
  - 5th Caisson, 6th Caisson — 3d Caisson Platoon
  - (Reserve)
- **Combat Train**
  - 1st Store wagon (6-horse)
  - (8 and 4) officers' led horses and (5 and 10) spare horses.
- **Field Train**
  - 2d Store wagon (6-horse)
  - Ration wagon (2-horse)
  - Forage wagon (4-horse)

### Battery (Field) in Line.




### Battery (Horse) in Line at Close Intervals.

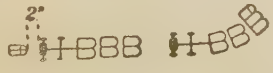



(in a horse battery this distance is 7 paces).

**Explanation of symbols.**

- Battery Commander.
- Lieutenant.
- 1st Sergeant.
- Commander of the reserve.
- Chief of Section, Caisson Corporal, N. C. O., Orderly.
- Trumpeter.
- Driver, Mounted man, Led horse
- Gun.
- Caisson.

Length of light field howitzer, horsed, is 18 paces.
In a horse battery, caissons are posted 9 paces in rear of the mounted squads of the guns.
The caissons may likewise follow in rear of any other piece, or in line.

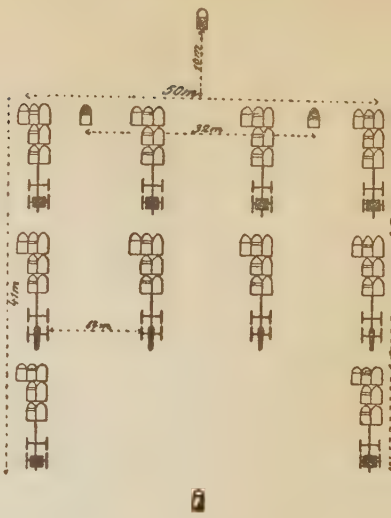



The caissons may likewise be posted on the right or left of their respective guns.

## Field Battery in Line.

**Organization.**

- **Firing Battery** (*batterie de tir*)
  - 1st Caisson
  - 1st Piece
  - 2d Caisson
  - 2d Piece
  - } 1st Platoon
  - 3d Caisson
  - 3d Piece
  - 4th Caisson
  - 4th Piece
  - } 2d "
  - 5th Caisson
  - 6th "
- **Reserve** (*Echélon*)
  - 7th—12th Caissons
  - 1 Field forge
- **Field Train** (*Train regimentaire*)
  - 1 Store wagon
  - 1 Forage wagon
  - 3 (horse btrs. 4) ration wagons

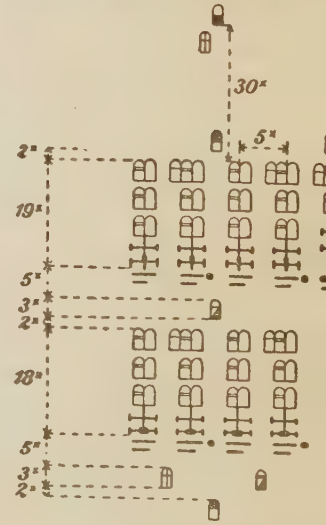



## Heavy Field Howitzer Battery.

**Organization.**

- **Firing Battery**
  - Observation wagon
  - 1st Piece
  - 2d "
  - } 1st Platoon
  - 3d "
  - 4th "
  - } 2d "
  - 1st Caisson
  - 2d "
  - } 1st Caisson Platoon
  - 3d "
  - 4th "
  - } 2d "
- **Reserve**
  - 5th "
  - 6th "
  - } 3d "
  - 7th "
  - 8th "
  - } 4th "
- **Combat Train**
  - Led horse and spare horses
  - Field kitchen
  - Store wagon
- **Field Train**
  - Kit wagon
  - Ration wagon
  - Forge
  - Forage wagon

## Order in Line at Close Interva




## Explanation of symbols.

- Battery commander
- Lieutenant
- 1st Sergeant
- Assistant 1st Sergeant
- N. C. O.
- Trumpeter
- Driver
- Led horse
- N. C. O. (dismounted)
- Gun squad
- Observation wagon
- Piece (howitzer)
- Caisson

## 21 cm. Mortar Battery.

**Organization.**

**Platform Echelon**

| | | |
|---|---|---|
| Observation wagon | | |
| 1st Platform wagon | } | 1st Platform Platoon |
| 2d " | | |
| 3d " | } | 2d " |
| 4th " | | |
| 5th " | } | 3d " |
| 6th " | | |
| 7th " | } | 4th " |
| 8th " | | |

**Gun Echelon**

| | | |
|---|---|---|
| 1st Carriage | } | 1st Carriage Platoon |
| 2d " | | |
| 3d " | } | 2d " |
| 4th " | | |
| 1st Gun wagon | } | 1st Gun Platoon |
| 2d " | | |
| 3d " | } | 2d " |
| 4th " | | |

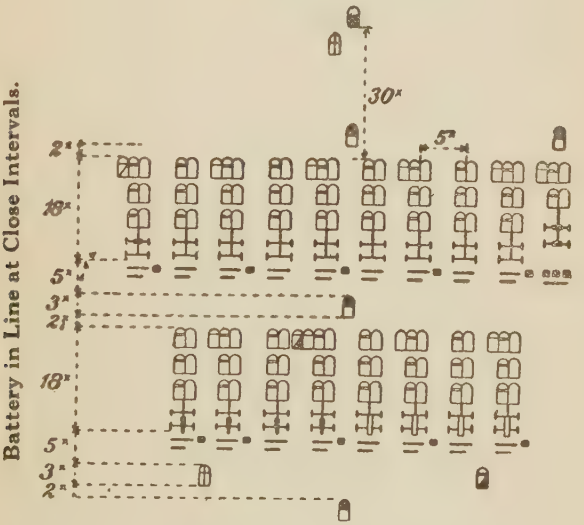
**Combat Train**

- Led horse and spare horses
- Field kitchen
- Store wagon

**Field Train**

- Kit wagon
- Ration wagon
- Forge
- Forage wagon

**Battery in Line at Close Intervals.**




### Explanation of symbols.

- Battery Commander
- Lieutenant
- 1st Sergeant
- Assistant 1st Sergeant
- N. C. O.
- Trumpeter
- Driver
- Led horse
- Farrier
- N. C. O. (mounted)
- Gun squad
- Observation wagon
- Store wagon
- Platform wagon
- Carriage
- Gun Wagon

1. It presents a number of small targets, separated by intervals, to the enemy's fire, and, as a result, minimizes losses, whereas the order in line at close intervals offers the enemy a single, compact target.

2. Disorders occuring at one piece are not communicated to other parts of the line.

3. The guns can turn, unlimber upon completing the advance, change direction easily, and evade obstacles, all of which is impossible in the order in line at close intervals, on account of the lack of room between the guns.

The order in line at close intervals should, therefore, never be used when it might become necessary to unlimber at once. But, the order in line at close intervals does enable the unit to be concentrated within the smallest space and is used for assembly and for parades. In the order in line at close intervals, the interval between guns is 5 paces in the German artillery, 6 paces in the Russian and the Austrian artillery, and 2 m. in the French artillery.

The **order in line** is used for movements to the front or rear under hostile fire, for moving forward hurriedly from a firing position in order to pursue, for crossing long ridges, and preparatory to going into, or upon evacuating a position. When longer distances have to be covered, the route column is used.* A German field battery of six guns has a front of 80 m., a Russian battery of eight guns, a front of 95 m., and a French battery of four guns a front of 47 m. In the order in line, it is still possible to execute turns of 90 and 180 degrees in which each carriage moves over the arc of a circle

*The following is quoted from General v. Berendt's "*Erinnerungen aus meiner Dienstzeit,*" in regard to the advance in line at Mars-la-Tour, of two batteries of the Xth Army Corps. "Several wet ditches, a number of roads across our path, and the exceedingly varied character of cultivation and vegetation considerably delayed some of the guns and platoons, while others, meantime, were able to continue their advance without trouble. It required an unusual amount of personal effort on the battery commander's part to lead the battery into its position, and I was glad when we finally approached the locality where we could open fire."

whose diameter is 16 paces. When in line at close intervals, the battery can move only by wheeling or inclining as a whole. Intervals may be extended or closed. (Pars. 301–302, German F. A. D. R.).

The **order in route column.*** Artillery uses roads as long as possible. The formation best suited to movements on roads is in the order in route column. In this, the carriages follow each other at four paces distance. In a horse battery in route column, the guns follow each other at thirteen, the caissons at nine paces distance. A reduction of this distance to 2 m., as in Austria, to 2.13 m., as in Russia (8-gun battery), and to 1 m., as in France, interferes with the smooth and steady movement of the battery. When a battery marches by the flank from route column (par. 302, German F. A. D. R.), the interval between guns is 23 paces (19+4=23) and is reduced, when necessary, to 20 paces. In order to shorten the column, **double column**† may be formed, the reserve (i. e., all the caissons) being brought up alongside the guns.

Being in line (or in line at close intervals), to form route column: The right (left) carriage moves straight to the front, the others in turn wheel to the right (left) and follow in rear of the first. Line is formed from route column by executing either "right (left) into line," or "right (left) front into line."

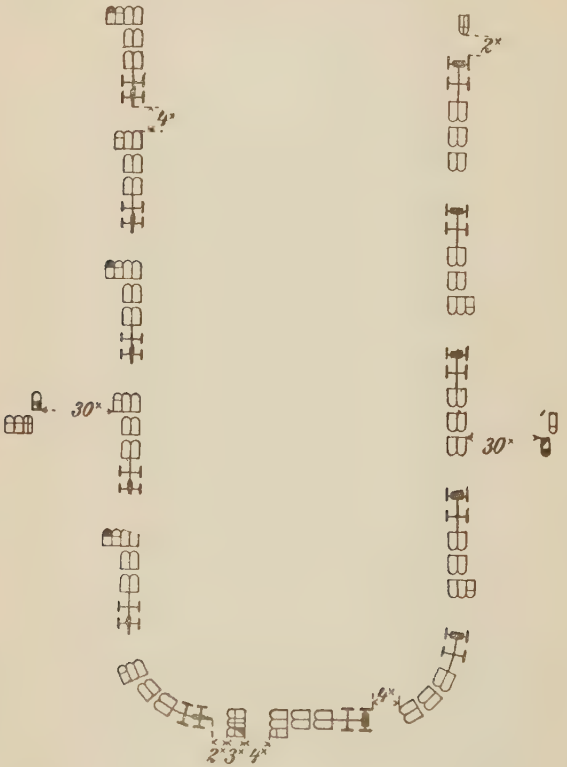
The order in route column is the habitual maneuver and route formation, and, on roads, is likewise used for assembly purposes. Route column enables artillery to utilize existing

**Kolonne zu Einem.* It differs from our section column in that the caissons do not follow their respective guns.

†*Doppelkolonne.* This corresponds exactly to the double section column of our Field Artillery. A literal translation of the German term was preferred since the Germans form their double (section) column differently than we do from route (section) column.—*Translator.*

roads, bridges, and the cover afforded by the ground. Besides, it is by no means unsuitable for flank movements, although the effectiveness of shrapnel fire forces artillery to abstain, whenever possible from making such movements.*

**Battery in Route Column.**



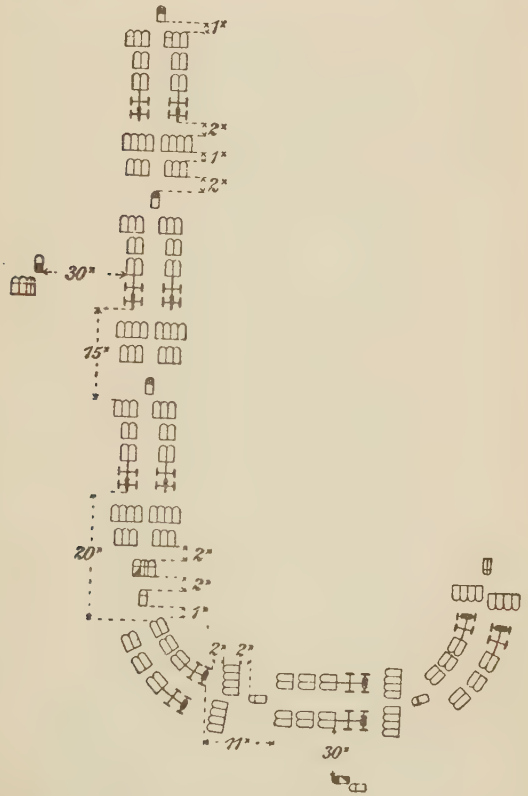

When in route column, artillery can form line quickly and easily and can avoid obstacles without difficulty. Under

*Flank marches involved very little danger during the Franco-German war, as the French shells had a small radius of effect and were, moreover, fitted with a single action fuze only, a defective one at that. HOHENLOHE, *Militärische Briefe*, III, p. 211.

At Vionville, the 1st Horse Battery of the 10th F. A., made a flank march on the ridge west of Vionville within 300 m. of hostile infantry and suffered but trifling loss. *Geschichte des Feldartillerieregiments Nr.* 10, p. 83. At Gravelotte, Eynatten's Battalion of Artillery executed a flank march in column of platoons under cover and unlimbered to the flank. *Geschichte des Feldartillerieregiments Nr.* 7, p. 245.

favorable conditions of light and background, artillery will be less conspicuous when advancing in route column than when advancing in line. Unless dust betrays the movement, artillery moving by the flank in route column is usually very difficult to distinguish against a dark background (for example, timber).

**(Horse) Battery in Column of Platoons.**




In addition, a battery is not so apt to get hit when it advances in route column as when it advances in line, as it will be difficult for the enemy to locate his bursts with reference to the head of the route column. Front into line should not be executed under hostile fire. In taking up a masked

position under the crest of a hill, the battery can move in route column under cover along the position and unlimber for action to a flank. By doing this, the pieces get into position more quickly, as they can be brought closer to the top of the crest than if the battery were to advance in line and were to unlimber to the front. But moving into position from a flank has the disadvantage that the battery can not form line so accurately facing the objective as if front into line had been executed.

Since gun and caisson belong together, the **column of platoons** at full and at close intervals has been abolished so far as field batteries are concerned. Horse batteries, which, in many cases, will not have their caissons at hand, still use it to reduce the length of their column. In column of platoons, the interval between guns is 5 paces, the distance between platoons, 15 paces. This distance is measured from the heads of the lead pair of one platoon to the rear of the carriages of the next preceding platoon. Being in route column, to form line: The battery first forms column of platoons, and then executes right (left) front into line, or right (left) into line, intervals being at the same time extended from 17 to 20 paces.

**Movements in column.** When the tactical situation requires and the terrain permits, artillery marching in column may use the gallop to good advantage, but the trot is the habitual gait. When moving to the battlefield, artillery should be able, without appreciable rest, to cover from 8 to 12 km. at the trot. In long artillery columns, it is advisable to increase the distances normally separating batteries. This should be done likewise when artillery is drawn forward from its position in the column, as the dust raised will dissipate more quickly and will therefore not annoy the other troops so much. In addition, no battery will be forced to trot uphill or over a bad piece of road in order to maintain its proper distance.

If for any reason a gun or a caisson is forced to halt, this check should in no circumstances be permitted to communicate itself to the rest of the column. Chiefs of carriage and drivers should keep a watchful eye upon the carriage preceding theirs, so that, in case that carriage is disabled, they may be able promptly to turn out of the column, without checking the gait, and trot past. A disabled carriage should regain its proper place in the column as soon as possible.

**Movements to the rear.** *The about by carriage.* On narrow roads a battery in route column may have to unlimber and turn carriages and limbers separately. On very narrow roads, a different method may sometimes have to be employed. In this, lead and swing pairs are unhitched and led to the rear past the column. The carriages are then unlimbered and each carriage and each limber are turned about. This will result in placing each limber in rear of its gun or its caisson body, as the case may be. The last piece (or caisson body), now become the first, is now removed and its limber attached to the piece (or caisson body) next in order, and so on, the last limber in the column picking up the first piece (or caisson body), previously run aside.

## TO UNLIMBER.

The battery can unlimber all its pieces simultaneously to the front or to the rear from line, and to a flank from column. In debouching from a defile (road), when it is imperative that fire be opened at once, guns may unlimber successively. It is not a good plan for a battery to use the same method of unlimbering each time it goes into action. The method of unlimbering should be selected with due regard to the tactical situation and the character of the ground.

**Action front** (pars. 269–278, 322–332, German F. A. D. R.) is usually employed when fire is to be opened quickly. The limbers wheel to the left about and go to their designated

position at a walk. They remain eight paces directly in rear of their guns in exceptional cases only. The battery commander decides whether or not gun limbers should be emptied entirely or partially. The reserve at once approaches the guns, from a flank if the gun limbers have vacated the space in rear of their guns, and unlimbers one caisson body to the right* of each piece. The caisson limbers are then emptied.

In the **order in battery,** the guns, unlimbered for action, are posted abreast of each other with normal intervals between them. This interval may be reduced to ten paces, or extended, provided fire direction is not hampered thereby. Large units, especially when firing from a captured position and at a retreating opponent, will frequently be forced to reduce intervals between guns in battery. In such a case, intervals may usually be diminished with impunity, as the hostile artillery will have suffered some loss. As far as practicable, battery and platoon commanders and chiefs of section should avail themselves of the cover afforded by the guns and caisson bodies.

The interval between batteries (30 paces) should in no event be gained at the expense of the interval between the guns. When there is plenty of room, or when the hostile artillery is superior, the intervals between guns in battery should be increased. Since advantage should be taken of the ground, the intervals between the guns in battery need not be uniform.

Caissons filled with shrapnel run comparatively little danger of blowing up when struck by intact projectiles. At the worst, the effect of such a shot is restricted to the caisson struck and the nearest piece. But if a shell should strike and burst in a caisson carrying shell, it may detonate the whole contents. This is bound to disable the two adjacent pieces and will place the whole battery out of action for some

*Since fixed ammunition is now used, loading would proceed more rapidly, if the caisson body were posted to the left of its gun.

time. It will, therefore, be advisable to place caisson bodies filled with shell beside the guns only in case hostile shell* need scarcely be feared, in other words, when one's artillery is occupying a masked position. In order to enable it to fire effectively from masked positions, artillery must be provided with observation towers or ladders and observation wagons.

Gun and caisson limbers are conducted and posted by the commander of the reserve, if an officer, otherwise by the first sergeant. When necessary, gun limbers are posted in one group and caisson limbers in another. The combat train is also brought up and joins the limbers. The two groups of limbers, each in route column, are posted abreast of each other, facing to the front with an interval of about twenty paces between them, about 300 m. in rear and, when practicable, to a flank of the firing position. Drivers dismount. The commander of the reserve or the first sergeant usually remains mounted. A caisson corporal designated by the commander of the reserve joins the firing battery and establishes signal communication with the reserve.

**Action rear** (par. 329, German F. A. D. R.). On heavy soil, it is advisable to turn the carriages about first and then to unlimber to the rear.

**Action right,** or left (par. 330, German F. A. D. R.). This is usually employed when the position can be approached under cover of a crest. The guns are drawn up the slope by their teams, but not so high that the enemy can see the mounted drivers over the crest. It is a good plan to send a mounted man to mark the line beyond which drivers should not advance. It is of course desirable to unlimber the guns under cover as close as possible to the position where they are to go into battery. To this end, drivers may be

*In 1903 during a Swedish firing test, a shrapnel burst in a caisson filled with 20 shell, and a shell penetrated another caisson and burst within it. Although explosive shell in the compartments of these caissons were torn to bits by these projectiles, their primers dented and the primer envelopes torn apart, so that the powder was exposed, not a single shell was detonated.

directed to dismount, though this entails the disadvantage that teams will not pull as well, particularly if the ground is soft.

The guns are brought into battery by hand, the prolonge being used when necessary.

Artillery may go into position openly, i. e., without attempting to conceal itself from view, or concealed, i. e., its guns and caissons sheltered from the enemy's view. Positions may be either unmasked, semi-masked, or masked.

In an **unmasked position,** the guns are not concealed from view and the line sights may be used in laying.

In a **semi-masked position,** the guns are concealed from the enemy's view, but a man standing beside a gun can still lay it for direction.

In a **masked position,** the guns are so concealed that it is impossible for the gunners to aim directly at the target.

The positions mentioned above give rise to a number of ways of going into position. In going into a masked position, for example, the guns may be unlimbered to the front, but the movement will usually be made at the walk, in order that it may not be betrayed by the dust raised. Upon unlimbering, the guns should stand where they are to fire. In case a battery is directed to conceal its movements while going into an unmasked or a semi-masked position, guns and caisson bodies are brought into battery by hand as soon as they are unlimbered. When the prolonge is used for this purpose, special care should be exercised that the men do not expose themselves. Men should not be posted to indicate the limits of the battery position when there is danger that the enemy's attention might be attratced thereby.

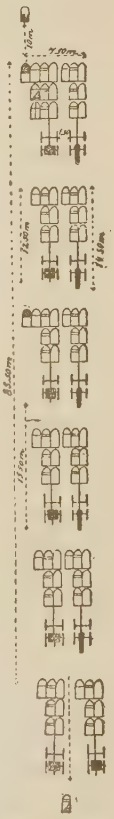
For details of the **order in battery,** see p. 290, *infra*.

When the position offers special difficulties, platoon commanders and chiefs of section may be brought up to reconnoiter the positions to be occupied by their guns and to supervise bringing them into battery. When this is done,

the first sergeant is left in charge of the guns. But when the distance between the battery and the position it is to occupy is considerable, one officer remains with the battery.

When practicable, the evacuation of a position should be so managed that the movement will not be perceived by the enemy. To this end, first the caisson bodies and, after the battery commander's command for changing position, the guns, should be run by hand far enough to the rear to enable the battery to limber up under cover.

**France:** "The chief of a unit is the guide of that unit," i. e., he indicates in his person, the direction and gait and should select his position so that the leaders of the leading subdivisions can see him well. When necessary, he may direct some other officer to act as guide in his stead. When several battalions operate together as one unit, each moves as if acting alone, but their leaders should maintain cohesion by coöperating with each other. The commander (*guide*) has no time to see that his orders are executed. A file closer (*serre file*) is charged with maintaining order.



The battery is divided into nine sections (*pelotons de pièces*). The first, second, third and fourth sections are gun sections, each consisting of one gun and one caisson. For tactical purposes, the battery is divided into the fighting battery (*batterie de combat*) and the field train. The fighting battery consists of the firing battery (*batterie de tir*) and the reserve (*echelon*). The firing battery consists of four guns and six caissons, the reserve of six caissons, the field forge and the store wagon. Of the six caissons in the firing battery, four belong to gun sections, each forming with the gun to which it belongs, a single unit (*pièce*); the other two caissons of the firing battery are to replace the first ammunition expended and are therefore called *caissons de premier ravitaillement*.

The *order in line* (*ordre en bataille*, see p. 262, *supra*), is that in which the four gun sections of the battery are posted abreast of each other, the caissons in front with three cannoneers mounted on each. The two caissons of the fifth section (*caissons de premier ravitaillement*) are posted in rear of the flank guns. The distance between carriages is 1 m. The interval between carriages is normally 14 m., but may be diminished to 2 m., and is never to exceed 30 m. Intervals are measured from the hub of one carriage to the hub of the next in line. On going into battery, each gun moves to a position abreast and to the right of its caisson, the limbers

wheeling to the left about over the arc of a circle whose diameter is 6 m. When the battery is in the order in line, however, and the interval between caissons is not less than 6 m., the guns may be moved abreast and 1.50 m. from their respective caissons, i. e., double section line may be formed.

The *order in section column* (*ordre en colonne par pièce*). In this the sections follow each other in column, the caissons being in front in each section, the distance between carriages being 1 m. The two caissons of the fifth section (*caissons de premier ravitaillement*) march at the tail of the column.

*Double section column* (*ordre en colonne doublée*) is employed when it is desired to diminish the length of the column. It is formed from section column by the guns moving up abreast and to the right of their respective caissons. From this column the guns may be directly unlimbered to the left. To unlimber to the right, guns and caissons must first change places, i. e., the guns must be moved to the left of their respective caissons.

The maneuvers of the battery are very simple. In the oblique march, each carriage individually makes the appropriate change of direction. During this movement, intervals may be increased or diminsihed. A wheel may be executed only when the battery is in the order in line at close intervals. To form section column from line, the right (left) section moves out, the other sections successively executing a partial change of direction and following the leading section. Line may be formed from section column or from double section column. The battery habitually forms line toward the side on which the battery commander posts himself.

In the *order in battery*, the guns stand to the right and .5 m. from their respective caisson bodies. The interval between one caisson body and the next one in battery is 14 m. As soon as a caisson has been brought into battery and unlimbered, the caisson body is upended, the lid of the chest to the rear. This lid, fashioned like a double door, is opened to right and left, and the automatic fuze setter (*débouchoir*), capable of setting simultaneously the fuzes of two projectiles, is dropped. The compartments of the chest are now exposed so that the projectiles may be removed. As the guns are provided with steel shields and as walls and doors of the caisson bodies are armored, ample protection is afforded the gun squads during lulls in the firing. The anchoring of the wheels, the so-called *abattage*, is very complicated. As soon as the gun is unlimbered, it is laid for direction. Then two men let down the brake shoes, while two others, at the same time, raise the trail (very high), until the shoes take hold. This is done in order that the brake shoes may hang down low so as to lock the wheels properly. This work is to be done very carefully in order that the piece—already laid for direction, be it remembered—may not be disturbed. But, since this is impossible, the gun must be relaid after it has been anchored. All this is done during a time when the battery is more defenseless than at any other, at a time when there is urgent need to open fire quickly. It is, at best, a very slow procedure, which may become very dangerous if hostile artillery saw the battery go into position.

The chiefs of platoon are posted in rear of the first caisson of their respective platoons. One of the caissons of the fifth section, the caisson section of the firing battery, is posted on the flank of the battery where the battery commander desires to observe the fire. The other caisson of this section is posted 15 m. in rear of the opposite flank of the battery. The limbers with their teams are posted in double section column 10 m. in rear of one of the flanks of the battery. The reserve (*echelon*), consisting of the remaining six caissons of the battery, is posted about 500 m. in rear of the position. The occupation of a position is invariably to be preceded by a reconnaissance, during which the battery commander is to expose himself as little as possible. The fire preparation should be as complete as possible, but should not cause loss of time. The battery commander indicates to the next senior battery officer a position (*position d'arrêt*) up to which that officer is to move the battery. The battery commander then proceeds to the locality tentatively selected for the battery. He is accompanied by a non-commissioned officer, whom he can later send back to notify the battery to come up, the quartermaster sergeant (*brigadier fourier*), a trumpeter, and the mounted orderly who carries the battery commander's telescope. Special care should be exercised that the enemy's attention may not be prematurely attracted by this reconnaissance. The battery commander examines the target, its nature and extent, measures its front, selects an aiming point, and decides upon the best way of bringing his battery into position. The flanks of the battery are indicated by the two non-commissioned officers with the captain. When the battery is to go into position at a fast gait, these two non-commisioned officers are posted some distance apart and covering each other so as to indicate the center of the battery. When desired, platoon leaders and gunners may be brought up and instructed in regard to the target and aiming point. The gunners select the positions to be occupied by their pieces, which are then brought into battery in the manner previously ordered. When the position can be approached under cover, batteries are habitually to unlimber to a flank.

**Japan:** The regulations of 1908 are almost an exact translation of the German regulations.

**Italy** (Drill Regulations of 1905): The lead driver of the directing gun is the guide of the battery or battalion. The platoon (battery) commander sees that the guide does his duty properly and is held responsible that his unit maintains proper direction and distance with reference to the directing carriage. Chiefs of section and platoon therefore ride abreast and on the near side of the lead drivers. The interval between carriages is 16.5 m. In horse batteries, the cannoneers are formed in double rank 30 m. in front of the battery and may form a screen (*batteria mascherata*).

*Section Column:* Carriages follow each other at a distance of 2 m. The reserve (*reparto di cassone*) follows either directly in rear of the battery or echeloned in rear of a flank. The depth of a battery is 155 m. (230 paces).

*Column of platoons:* The platoons, their carriages in line at extended intervals (16.5 m.) or at close intervals (5.25 m.), are posted in rear of one another at a distance of 5 m. Line is formed by executing right (left) front into line, or by platoons simultaneously executing right (left) into line, or on right (left) into line.

The *order in line of columns* (*Ordine in linea di colonne*): The platoons, each with the caissons belonging to it, are in section column, abreast of one another. The depth of this column is 70 paces (53 m.). Intervals may be diminished to seven paces (5.2 m.) or extended to 44 paces (33 m.). This formation is better suited than the section column for maneuvering under artillery fire and for crossing difficult ground.

**Austria:** One gun and one caisson constitute a section,* two sections, a platoon, two or three platoons, a battery. In addition, a battery has one telephone wagon. In the *order in section column*, the sections of the battery follow each other in column, the distance between carriages being 2 m. When it is desired to decrease the depth of the section column, the caissons may march abreast of their respective guns, in other words, double section column may be formed. In the *order in line*, which is modeled after the line of columns (*ordine in linea di colonne*) of the Italians, the platoons, each in section column, are posted abreast of each other with intervals of 40 m. between them. The line is to be used as the maneuvering formation under hostile fire. The *order in line at close intervals* is similar to the order in line, but the interval between platoons is 5 m. It is used as an assembly formation. In the *order in battery*, the guns, unlimbered, are posted at intervals of 20 m., caisson bodies on the

right of their respective pieces. Larger intervals are considered desirable, smaller intervals to be avoided. When a battery is about to go into position, its commander ascertains whether time enough is available for doing so under cover. When practicable, the movements of batteries going into

* *Halbzug*, literally, demi-platoon.

position should be concealed. To this end, drivers may be ordered to dismount, and the guns brought into battery by hand by the personnel or, when necessary, by the support. In field batteries, the reserve is formed of caissons belonging to the ammunition columns. In field howitzer batteries, the caissons that do not belong to the gun sections form the reserve. Great importance is attached to designating an officer whose duty it is to take charge of fire direction in case the battery commander's observation station is at a distance from the battery. Importance is likewise attached to protection against surprise. The officer in charge of the limbers selects a position for them.

In horse batteries, which, by the way, have four guns, the interval between carriages is 15 m. These batteries use the *column of platoons* in addition to the other formations employed by field batteries. In column of platoons, the commander of the second platoon is posted 2 m. in rear of the rear rank of the squad of cannoneers of the leading platoon. The caissons may be directed to follow the battery at a distance of 500 m.

**Russia** (Provisional Regulations of 1907): One gun and one caisson constitute an inseparable unit, the section. The firing battery consists of eight guns and eight caissons, the battery reserve of eight caissons. Two gun sections form a platoon, two platoons, under a captain, a demi-battery. Full interval is 24 paces (17 m.), reduced interval, 16 paces (11.4 m.), and close interval, 8 paces (5.5 m.). Section column and line of platoons in section column are used. In the *order in section column*, the sections, each in section column, follow each other. In the order in *line of platoons in section columns*, the four platoons, each in section column are posted abreast of each other with intervals of 16 paces (11.4 m.) between them. When in this formation, the b attery has a front of 35 m. and a depth of 70 m., including the battery reserve, a depth of 105 m. To diminish the depth of the battery, caissons of the gun sections may be posted abreast of their guns (double section), or, when the battery is in line at full intervals, may be posted in front of their guns. Artillery is to conceal its movements as much as possible when going into position. Guns are not loaded until they are in battery. Guns and caissons unlimber at the same time. One caisson body is posted, under cover when practicable, in rear of each gun. Gun and caisson limbers of gun sections move to the rear. When the limbers are posted in close proximity, ammunition is first to be taken from them, and then from the caisson bodies. But in practice, the ammunition in the caisson bodies will be used first, as a rule, as it is close at hand. As soon as the ammunition in the caisson bodies is exhausted, the caisson limbers are brought up, the ammunition compartments with their ammunition taken out and deposited beside the caisson bodies. The latter are then limbered up and sent back to the battery reserve. As soon as the commander of the battery reserve notices that the caisson limbers have gone forward, he sends the full caissons of the battery reserve to the firing battery. These caissons are unlimbered in the position, their caisson bodies are left with the guns and the limbers move back to the position of the gun limbers. But the battery

commander may first use the ammunition of the caisson limbers, order up a certain number of caisson bodies, leave the contents of the caissons of the gun sections untouched and take an adequate supply from the battery reserve at the start, or deposit beside the guns, upon unlimbering, the ammunition carried by the caisson limbers.

**England**: The interval between carriages is 20 yards (18 m.). The distance between carriages in column is 4 yards. Formations: The order in line, the order in echelon (by platoon), column of platoons (the so-called battery column) and route column. The battery is divided into the firing battery (6 guns and 6 caissons) and the reserve (6 casisons). A battery may go into position either directly or after some preparation has been made. In the latter case, the position that each gun is to occupy is selected and marked. When the battery moves directly into position, the caissons drop back to a position 36 m. in rear of the guns. At the command "Action Front," the guns move into the position. At the command "Drive On," the limbers, except those of the two flank guns, move forward one pace, wheel to the right about, and move at the trot to their position. The limbers of the right and left flank guns take post abreast of the line of guns, ten paces from the right and the left flank, respectively. These two limbers are at once unhitched and the poles turned toward the front. As soon as the trails of the guns touch the ground, the caissons drive up abreast and 15 cm. to the left of their respective guns, axles of guns and caisson bodies on a line, in order that the protection afforded by the shields of the guns and caissons may be utilized to the fullest extent. The caissons are then unhitched. Limbers, teams and led horses move to the rear to their position.

The ammunition in the caisson bodies is to be used first, as a rule. When the caisson bodies are emptied, they are unlimbered and pushed to the rear, and their limbers drawn back until their axles are on line with the gun axles.

As a rule, carriages and limbers are to be posted abreast of each other at full intervals, either to the right (left) rear of the guns, or directly in rear of them. In the latter case, they are not to be closer than 360 m. to the guns.

When it becomes necessary to replenish ammunition, the caissons of the reserve are brought up, one being placed on the right of each gun. When the battery is not exposed to a heavy fire and when there is no danger that they may betray the position, these caissons may drive directly alongside the guns, unhitch their teams and hitch them to the empty caissons and drive to the rear. In case the battery is exposed to a heavy fire, any method of replenishing ammunition may be employed, but, when practicable, lulls in the firing are to be utilized for this purpose.

## 4. THE BATTALION.*

In the German artillery, the battalion movements laid down in the drill regulations are to be executed by "orders," not by "commands." Evolutions are to be confined to those absolutely essential for assembling and moving the larger units outside the zone of hostile fire. Attention should principally be paid to the combat leading of the battalion and this is quite naturally done more often by means of "orders" than by means of "commands." For a mobilized battalion of artillery to maneuver after the fashion of cavalry is not simulating war conditions, since artillery will rarely be required to deploy from a close formation in a direction not previously reconnoitered. Such a deployment furthermore requires horses well broken to harness, and well trained drivers, platoon leaders and chiefs of section. As the strength of a battery in men and horses is nearly doubled on mobilization, and as each battery is obliged to detach a good many men and horses at the same time, accurate evolutions with a mobilized battalion are an impossibility.

### FORMATIONS.

The **order in line.** The batteries, each in line, are posted abreast of each other, with intervals of 30 paces between them. They may be posted in any order from right to left at discretion. The intervals between batteries may be extended or closed.

The **order in line at close intervals** (*Breitkolonne*): The batteries, each in line at close intervals, are posted abreast of each other with intervals of 15 paces between them, the battery reserves in rear. This formation is used for assembly and for parades.

*Pars. 342–352, *German F. A. D. R.*

The **order in mass** (*Tiefkolonne*):* The batteries, each in line at close intervals, are posted in rear of one another with distances of 15 paces (horse batteries, 24 paces) between them. The battery reserves are posted either in rear or abreast of their batteries. This formation is used for the same purpose† as the order in line at close intervals.

The **order in route column:** The batteries, each in route column, are posted in rear of one another with distances of 15 paces (horse batteries, 20 paces) between them. Ordinarily, the battery reserves are posted directly in rear of their respective batteries, but, during a flank march, or when it is desired to decrease the depth of the column, they may be posted abreast of their respective batteries (double column, which in form corresponds to our double section column).

**Line of route columns** (*Batteriekolonnen*): The batteries, each in route column, are posted abreast of each other with intervals of 130 paces between them. Depending upon the available room and the nature of the ground, these intervals may be diminished or increased. This formation is used for movements on the battlefield.

In certain circumstances, the battalion commander may have to give special instructions in regard to the disposition of the battery reserves.

In addition to the formations described above, horse artillery battalions use the **column of platoons** (batteries, each in column of platoons, following each other at a distance of 25 paces), and the **line of platoon columns** (*Abteilungskolonne*) in which the batteries, each in column of platoons, are posted abreast of each other with intervals of 30 paces between them.

*In our artillery, a battalion is said to be *closed in mass* when it is in column of batteries at closed distances.—*Translator.*

†On August 18th, 1870, the corps artillery of the Prussian Guard Corps used this formation during its advance from Doncourt to a point beyond Anouy la Grange. On this occasion, battery reserves were posted in the second line, in rear of each battery. On approaching the effective zone of the French Artillery, the reserves were halted. The batteries then went into action one after another, those following the leading battery being echeloned to the left and front of that battery. HOHENLOHE, *Militärische Briefe*, p. 218.

**France:** When the battalion is in line, the batteries are posted abreast of each other with an interval not greater than double that between carriages and not less than 6 m., between them. The mass, in which the batteries, each in line, are posted in rear of each other at a distance of 20 m., is used for parade. The habitual maneuvering formation on the battlefield is the line of section columns (*ordre en ligne de colonnes par pièce*). In this, the batteries, each either in section column or in double section column, are posted abreast of each other with not less than 14 m. between them. When this interval is 14 m. or less (in horse artillery battalions, 17 m. or less), the formation is termed the order in line of section columns (or double section columns) at close intervals (*ordre en masse de colonnes par pièce ou doublée*). The French attach less importance to their section column and double section column, in which the batteries are posted in rear of one another at 20 m. distance, than the Germans do to their corresponding formations, the route column and the double column. The reserve follows 30 m. in rear of the last battery, the distance between battery reserves being 20 m. The reserve drops back to 500 m. when the battalion approaches the selected position, halts at that distance when the battalion goes into position, and sends battery reserves to join their batteries in case any of the latter are detached from the battalion to carry out special missions. The staffs are numerically strong. The manner in which communication is to be kept up between the various elements of the battalion, is prescribed in great detail.

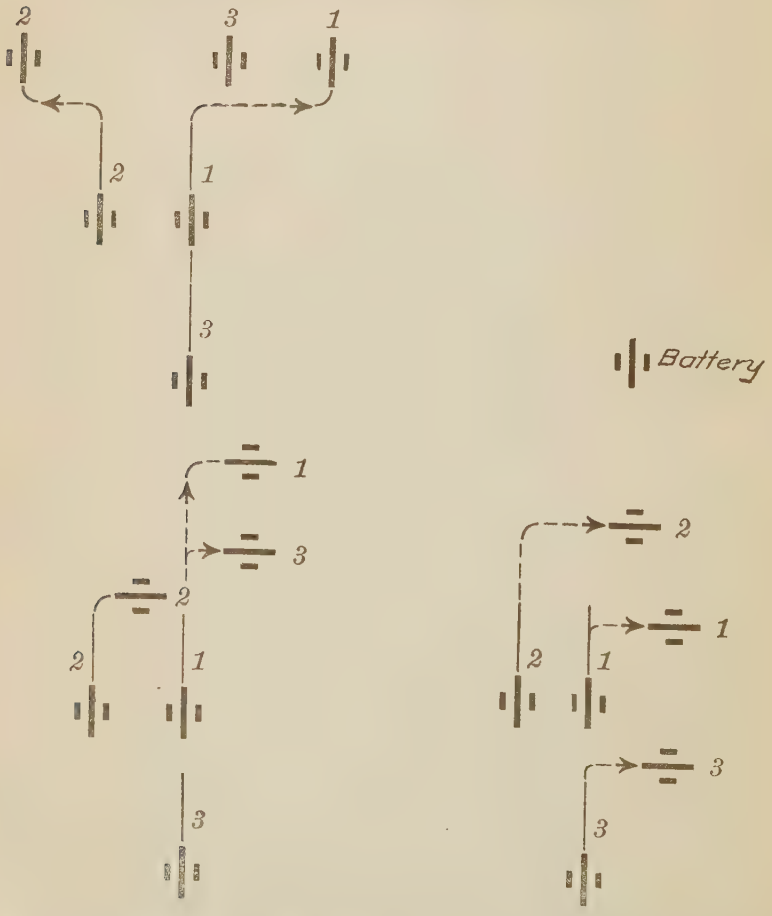
**Italy:** The battalion (*brigata*) consists of four field batteries. The *column of batteries* is used for assembly. In this, the distance between batteries is 21 paces (15 m.). For movements on the battlefield, the Italians use the *line of columns*. In this, the batteries are posted at deploying intervals abreast of each other, each battery being either in column of platoons, in section column, or in line of platoons in section columns (*brigata in linea di colonne di sezione*). Section column and column of platoons (at full or closed distance) are likewise used on the battlefield, as is also the order in line, the batteries at closed or extended intervals. From the moment when the artillery leaves the column, the battalions are no longer to be moved according to the hard and fast rules of the drill regulations. Batteries are to be moved into position by their leaders in the most suitable formation and along such roads as may be available.

**Austria:** Two field or three horse batteries constitute a battalion (*division*). The formations used are the order in section column, the order in line, the order in battery, and the order in line at close intervals (*Masse*). In the last-named formation the batteries, each in line at close intervals, are posted abreast of each other with close intervals between them.

In the order in line, the interval between batteries is 30 m., in the order in line at close intervals (*Masse*) it is 10 m. In section column, the distance between batteries is 30 m. The interval between batteries in the order in battery is not prescribed.

A horse artillery battalion consists of three horse batteries. In addition to the formations mentioned above, the horse artillery battalion employs the *double column*. In this, two of the batteries, each in column of platoons, are posted abreast of each other either with full interval

**Deployment from Double Column.**




(30 m.) or close interval (8 m.) between them; the third battery, likewise in column of platoons, is posted 20 m. in rear of the right or the left battery. The double column is used as an assembly and maneuvering formation both on and off the battlefield. All changes of formation are habitually executed at an increased gait. The reserves generally follow under com-

mand of an officer. The deployments are by no means simple. "To form line to the front from double column, the right column executes right front into line, the left column, left front into line. When very little room is available in front, the deployment may be effected at the saber signal "extend" (*Öffnen*), given by the battalion commander, the two columns moving to the right and left respectively and forming line to the rear, whereupon they are at once halted." In deploying toward a flank, the interior column (i. e., that on the flank toward which the deployment is to be made) may be assigned the longer route, the exterior column unlimbering toward the flank (action right rear), or the interior column may at once unlimber to a flank while the exterior column places itself on a flank (action right).

The *ammunition supply* is managed as follows: The personnel in the first place empties the caisson bodies of the caisson platoon and carries the ammunition to the guns. As soon as these caisson bodies are emptied, the commander of the reserve is ordered to send up two full caissons, which replace the empty caissons of the caisson platoon. The latter then drive back to the reserve, where they are refilled with ammunition taken from the limbers, if necessary. The ammunition in the gun limbers is to be kept intact as long as possible.

**Russia:** The battalion consists of three batteries, of the first reserve, composed of the battery reserves, and of the battalion reserve, The latter is composed of twelve caissons, four from each battery reserve, and is commanded by an officer. This reduces each battery reserve, which normally has eight caissons, to four caissons.

The *order in line* at full intervals (17 m.), reduced intervals (8.5 m.), or close intervals (2.55 m.) between guns is used. In this the interval between batteries is 17 m. The four caissons of each battery reserve follow the fifth gun of their battery during movements in section column and take post in rear of their respective platoons after the guns are unlimbered.

The *order in section column:* Caissons are united into one body in rear of the guns. The distance between batteries in column is 21 m. Upon reaching the battlefield, the battalion reserve follows in one body at the tail of the battalion.

*Column of platoons:* This is used on broad roads and for movements outside the zone of hostile fire. In this formation the batteries follow one another at a distance of 21 m.

The *order in mass:* The batteries, each in line at close intervals, are posted in rear of one another. This formation is used for parade.

The *order in line of columns:* The batteries, each either in section column or in column of platoons, are posted abreast of each other with intervals of 35, 71, or 156 m. between them, depending upon the manner of their subsequent employment. This formation is similar to the German line of route columns (*Batteriekolonnen*), both as regards form and employment.

The *order in line of platoon columns* corresponds to the French order in line of section (or double section) columns, the so-called *ordre en masse de colonnes par pièce ou doublée.* In this formation, the batteries, each in column of platoons at close intervals, are posted abreast of each other with intervals of 8.5 m. between them, the battalion reserve being posted in rear of the fighting batteries. It is used for assembly and for maneuvering outside of the zone of hostile fire. When in this formation, a battalion of three field batteries has a front of 46 m. and a depth of 123 m.; a horse artillery battalion of two horse batteries, a front of 28 m. and a depth of 102 m.

## 5. HEAVY ARTILLERY.

The battalions of heavy artillery assigned to army corps are usually field howitzer battalions of four batteries and a heavy artillery ammunition column of eight sections, each

comprising seventeen caissons. The heavy field howitzer, model 1902, is a recoil gun without shields. Its limbers carry no ammunition, its caisson bodies carry 36 shell each. The mobility of this gun is suited to its task. It can keep up with infantry even on indifferent roads, can move at the trot across country, provided the ground is favorable, and can cover as much as 7 km. per hour on good roads. Its rate of march at the trot and walk is the same as that of field artillery.

For the organization of the heavy howitzer battery, see pp. 262 and 263, *supra*.

The tactical formations are very simple. The order in line at close intervals is used for assembly, the route column or double column for marching. The formations are the same as those described under field artillery.

The battery commander indicates the target and the sector assigned to the battery to the observer (an officer). to the assistant observer, and to the instrument sergeant, determines the general direction in which the fire is to be delivered and directs the observation station to be established at a point from which he can observe the fire with ease and direct it with certainty. He likewise determines the firing position, indicates how communication is to be kept up between firing battery and observation station, and directs the fire of the battery. During the firing, he may join the firing battery whenever he deems his presence there necessary. In such an event, the observing officer takes charge of fire direction.

The executive officer is the captain's representative in the firing battery. He gives all commands, supervises their execution and, when necessary, provides for flank protection. When firing from a masked position, he indicates an aiming point, unless the battery commander has already done so. Before fire is opened, he examines the positions of the various pieces to see that their axes are parallel. He, likewise, assures himself that charges and fuzes are properly assembled,

adjusted and stored, and sees that losses in the personnel are made good.

The observer is charged with erecting the observation station and with installing communication with the battery. He supervises the telephone squad, and assists the battery commander in reconnaissance and fire direction.

The assistant observer has direct charge, under the direction of the observer, of the erection of the observation station. He is also charged with making and keeping a record of the firing data as announced by the battery commander.

The instrument sergeant* determines deflections for the first shot, when the battery is occupying a masked position. Accuracy and certainty in handling the instruments are absolutely essential for this. During the firing he acts as a telephone operator or observer.

The signal squad installs communication between the observation station and the firing battery and serves the telephone and signal flag equipment.

The observation station is installed before the guns are brought into battery. The guns are unlimbered at the command of the battery commander, the cannoneers stack arms and everything is made ready for firing. The caissons move up to the guns and are relieved of their ammunition, which is stacked up to the left of each gun. It takes a battery about five minutes to get ready for firing. Limbers and caissons move about 500 paces to the rear, toward the reserve, which they may be ordered to join. When cover is lacking, they may be formed in route column facing the battery.

In exceptional cases, when it is probable that strongly fortified field positions or barrier fortresses will have to be attacked, 21 cm. mortar battalions may be assigned to army corps. These mortars possess very little mobility, although gun and mount are transported separately. The mortar battery, its observation wagon excepted, can move at a walk

*Richtunteroffizier.

only. On bad roads and heavy grades the draft power of its teams is generally insufficient. For this reason, supporting troops are attached to these batteries from the outset. Bad places in the road must be repaired before a mortar battery can pass them. Special measures must be taken to move a mortar battery over soft ground off the roads. These batteries use the same formation as howitzer batteries. The mortar can be fired only from a gun platform. The gun platforms are laid before the guns move up to the position. As soon as the platforms are in place, the wagons carrying the gun carriages are brought up and unlimbered. The gun wagons then move up, and the guns are mounted on the carriages and made ready for firing. As soon as the various wagons are unloaded, they limber up and assemble in the formation and position ordered.

The formations used by the mortar battalions are the order in line at close intervals, the order in mass,* and the route column. Before moving into position, a mortar battalion forms column of echelons. In this, the observation wagons are followed by the platform echelons of the first and second batteries, these being in turn followed by the batteries proper.

*See p. 280 *supra*.

## Howitzer Battalion with Reserve in Route Column.

Battalion observation wagons

Observation wagon of 1st battery

" " 2d "

" " 3d "

" " 4th "

1st Firing battery

2d " "

3d " "

4th " "

Reserve of the 1st battery

" " 2d "

" " 3d "

" " 4th "

## Mortar Battalion in Column of Echelons.

Observation wagons of the battalion

Observation wagon of the 1st battery

" " " 2d "

Platform Echelon

Platform echelon of the 1st battery

" " " 2d "

Gun Echelon

Gun carriages } 1st battery

Guns }

Gun carriages } 2d battery

Guns }

**France:** Each army corps has two heavy howitzer batteries, each consisting of two Rimailho howitzers (officially 155 cm. c t r = *court tir rapide*). The howitzer and its mount are separately transported. The howitzer has long recoil carriage and is provided with shields. It fires a shell weighing 43 kg., which is filled with a charge of 13 kg. of melinite. This howitzer is to be used against shielded batteries and against troops protected by splinter proofs. Its rate of fire is said to be five rounds per minute.

## 6. RÉSUMÉ.

A comparison of the formations of the three arms shows that the cavalry has a great diversity of formations, that the artillery has but a very small number, and that the infantry holds the mean between the two.

The combination of horse and trooper enables cavalry to employ a large number of different formations. And it needs all of them, since it must be able to maneuver until the last minute, just before the shock takes place, in order to gain the enemy's flank or to meet a flank attack. It is frequently impossible to determine beforehand in what direction the charge will finally be made. The nature and speed of all cavalry movements, as well as the rapid course of the mounted action demand that cavalry be able to form line quickly from any formation and in any direction.

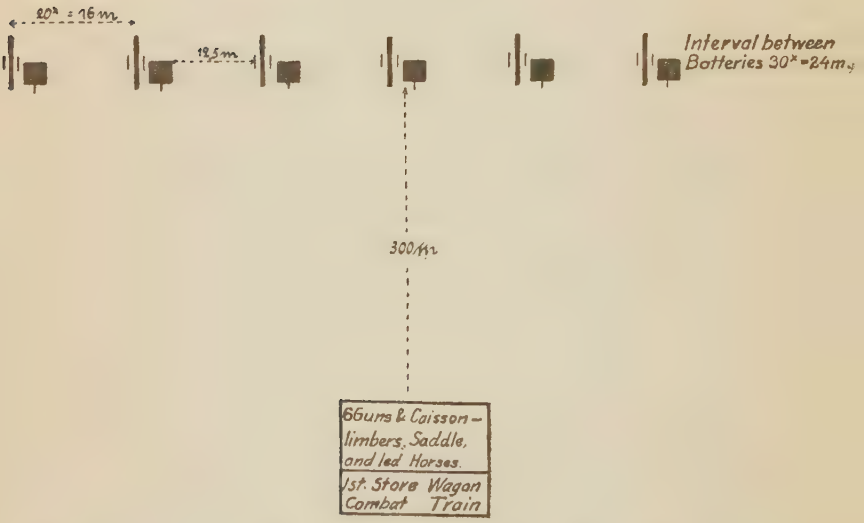
In the infantry, all movements in combat are made at the walk, or, at the most, partly at a run. The only combat formation employed when fighting infantry, is the skirmish line, which, when it enters the zone of hostile fire, is capable of moving straight to the front only. Close order formations are used only outside the zone of hostile fire.

In the artillery, a similar diversity of formations as in the cavalry is out of the question. Artillery uses roads whenever possible and does not leave them, as a rule, until just before it goes into action. The movements of the artillery carriages are more difficult and depend to a greater extent upon the terrain than those of mounted men. Besides, artillery positions

are reconnoitered beforehand, so that changes of formation and of front need not be executed at the last moment. Moreover, artillery fights at a halt only and the order in battery, the guns unlimbered and in line at full intervals, is its sole combat formation.

## THE ORDER IN BATTERY.*

### Germany.


20ˣ = 16m.
12.5m.
Interval between Batteries 30ˣ=24m.
300m.
6 Guns & Caisson – limbers, Saddle, and led Horses.
1st Store Wagon Combat Train

Present with the firing battery: 4 officers, 7 N. C. O., 43 privates.

Ammunition available on opening fire (that of a light field howitzer battery shown in brackets):

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (a) In the firing battery.. | 528 | shrapnel† | [156 | shrapnel, | 192 | shell], | | |
| (b) In the reserve..... | 216 | " | ‡[170 | " | — | " ], | 36 | shell.ʔ |
| (c) In the light ammunition column..... | 352 | " | [ 58 | " | 348 | " ], | 264 | " |
| Total..... | 1,096 | " | [384 | " | 540 | " ], | 300 | " |

The light ammunition column is posted not more than 600 m. away.

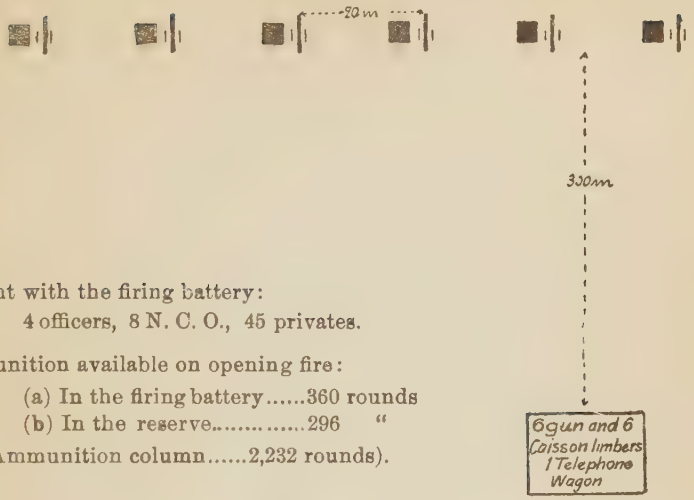
*Field batteries (guns) alone are considered.

†In the six caisson bodies, 312 shrapnel, in the six gun limbers, 216 shrapnel, total 528.

‡In the six caisson limbers.

ʔIn the first store wagon.

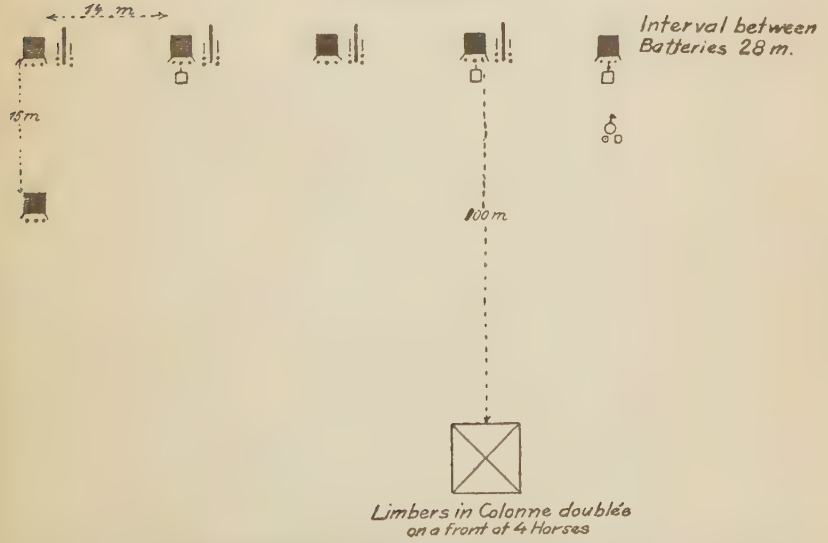
## Austria.




Present with the firing battery:
4 officers, 8 N. C. O., 45 privates.

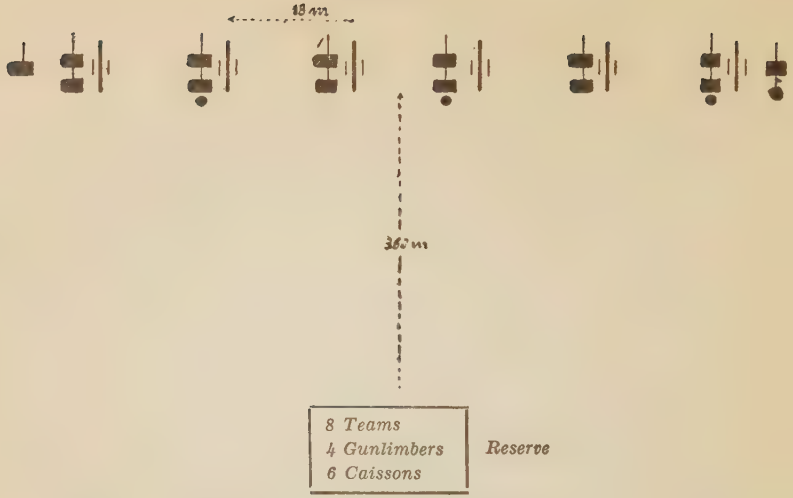
Ammunition available on opening fire:
(a) In the firing battery.....360 rounds
(b) In the reserve.....296 "
(Ammunition column.....2,232 rounds).

## France.



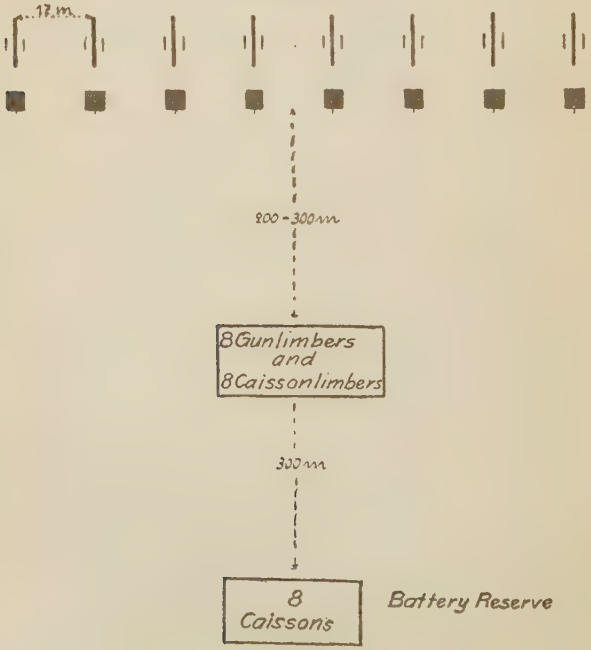

Present with the firing battery: 40 men, 2 horses (that of one trumpeter and that of the B. C.)
Present with limbers and teams: 35 men, 74 horses.
Ammunition in the firing battery: 432 shrapnel.
" in the limbers: 240 "
" in the reserve: 432 " , 144 explosive shell.
The reserve is posted 500 m. in rear of the battery.

## England.




Present with the firing battery: About 50 men.
Ammunition in the firing battery: 336 rounds.
" in the reserve (4 gun limbers and 6 caissons): 552 rounds.

## Russia.




Present with the firing battery: About 70 men.
Ammunition in the firing battery: 384 rounds.
" " limbers: 308 "
" " battery reserve: 704 "

## III. EMPLOYMENT OF ARTILLERY IN ACTION.

### 1. GENERAL PRINCIPLES.

Field artillery is to pave the way for victory. It is essential, therefore, that it shoot well and at the proper time and place. Heavy artillery may be used even at very long ranges against targets that prove too much for field artillery or that are most dangerous to the infantry. The fire of heavy artillery has a decisive effect upon shielded artillery when visible, upon infantry in trenches or behind parapets, and particularly upon fortified supporting points. But the first and foremost duty of heavy artillery consists of relieving its field artillery, in order that the latter may devote itself to supporting its infantry. The effectiveness of artillery depends upon observation of its fire, upon the determination whether its shots strike short or over, in order that errors in estimating the range may be corrected and the correct range obtained. At long ranges, observation of fire may be so difficult that an adequate effect may be counted upon under favorable conditions of terrain, weather, etc., only. When observation is impossible, as on dark nights, during rainy or foggy weather, it is usually not worth while for artillery to go into action.

Artillery usually opens the fire fight and, so far as considerations for its saftey permit, must accordingly be placed as near the head of the column as possible. It is important to deploy a superior number of guns at the very start and to develop a mass effect as early as possible. The employment of artillery by regiments or by battalions is the rule, the use of single batteries, the exception. The use of single platoons, or, occasionally, of single guns may become justified in un-

usual situations, such as might arise in mountain warfare, in street fighting,* or when certain portions of the terrain have to be kept under fire and when an assault has to be prepared or repelled. But in such cases the fire is dispersed and it is difficult to supply ammunition.†

The French and the Russian regulations permit single guns to be posted in trenches. This practice was justifiable only so long as the effect of a round of canister was considerably superior to the fire of a number of infantrymen posted in the same space, so long as the attacker's artillery did not possess the means quickly to silence such guns, and the range of the infantry rifle was not long enough to reach the assaulting troops that were assembling some 400 or 500 paces from the trench. The practice of posting guns in shelter trenches causes artillery units to be broken up and consequently to be more quickly vanquished than would otherwise be the case. Artillery should be posted behind cover specially constructed for its use, for, if it is posted in the general line of trenches, the space occupied by it reduces the fire power of the infantry. If guns posted in infantry trenches are silenced or withdrawn at a decisive moment, this is bound to exert a discouraging influence on the garrison of the trenches. When all is said and done, it must be admitted that guns can find better and more profitable employment outside of the general line of trenches. The same is true of the use of platoons of artillery in the defense of forests and villages, a practice much in vogue in the past.

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*An example of street fighting, taken from the more recent military history is the breaching of the Landau gate of **Weiszenburg** at a range of 50 paces by a platoon of the 3d Battery of the 5th Prussian Field Artillery and at a range of 500 paces by another platoon of the same battery. HOFFBAUER, *Deutsche Artillerie*, p. 29.

**Bazeilles.** Two guns fired effectively against a garrisoned house and then turned their fire upon Villa Beurmann. After firing some twelve rounds, these guns had to be drawn back by infantry.

**Le Mans.** A few rounds sufficed to force the French to evacuate a strongly occupied café on the Place des Halles. *Gen. St. W.*, IV, p. 898.

**Leyriz,** *Zur Ausbildung der Feldartillerie*, (1900), p. 59.

It is always dangerous to expose guns to the fluctuating course of village fighting. Example: Loss of a gun of the Saxon artillery during the night attack on **Etrepagny,** November 29/30, 1870. KUNZ, *Deutsche Reiterei*, pp. 227–234. But artillery fire is the surest means, on the other hand, to force the garrison of a key point to abstain from further resistance. Because of the absence of artillery support, it was impossible to capture the key of the position at **Sandepu** (1905). See *Taktik* VI, pp. 101–102.

†"As the artillery had been distributed among the various units during the battle at Matsiunda, platoons of artillery being frequently sent to support this or that section of the battle line, it had become badly mixed up." RENNENKAMPF, *Schlacht bei Mukden*, p. 180.

"*New Weapons, new tactics.*" The short range of smooth-bore guns necessitated bringing the guns within close range of their target in order to obtain a mass effect, but did not permit the fire of a long artillery line to be concentrated on one point. For this reason, the batteries destined to prepare the decisive assault, had to be kept out of action until the decisive point in the enemy's line was recognized, and the enemy held in check all along the line and forced to put in his reserves.*

These batteries were usually taken from the divisions kept in reserve. The range of the light guns was about 1,500 paces, that of the heavy guns 2,000 paces. In the armies of the French Republic, the artillery was equally divided among the divisions. This practice was not calculated to promote the formation of large artillery masses. For example, the long line of twelve-pounders at **Austerlitz** had to be formed by drawing platoons of those guns from the various units. The massed employment of the Austrian artillery at **Aspern** forced the French to form an artillery reserve of 120—140 guns, which was then attached to the Imperial Guard.

In 1812, Napoleon assigned corps artillery to each one of his army corps, but he never thought of creating army artillery.

At **Wagram,** General Drouot formed an artillery mass of 60 guns drawn from the Guard and 40 guns drawn from the divisions kept in reserve, for the purpose of preparing the attack to be delivered by MacDonald's column. The artillery of the Guard fired 15,000 rounds and lost 18 officers, 457 men, and 564 horses and, in consequence, was unable to move after the battle.†

At **Friedland,** in spite of the remonstrances of the division commanders, General Sénarmont advanced 30 guns of Victor's corps to within 400 m. of the hostile line. After firing five or six salvos, he advanced the guns to 200 m. and, finally, after firing twenty salvos from that position, he advanced them to a point 120 m. from the hostile line. This artillery force achieved brilliant results. In twenty-five minutes, inclusive of the time consumed in changing position, it fired 2,516 rounds, among these 368 round shot, an average of from three to four rounds per gun per minute. In addition, these guns without assistance repelled a cavalry charge directed against them. Their losses amounted to only 4 officers and 52 men.‡

The contrast between the Napoleonic use of artillery and the use made of that arm during the Franco-German war is marked. During this war, the Germans were able quickly to form large artillery masses and to

*HOFFBAUER, *Entwicklung des Massengebrauchs der Feldartillerie*, Berlin, 1900.

†GIROD DE L'AIN, *Grands Artilleurs*, p. 32.

‡*Ibid.*, pp. 180 and 183.

combine the fire of long lines from the very opening of a battle. This gave their artillery such a decided superiority over the French artillery, which was employed, in the main, like the smooth-bore artillery of the past, that the attainment of the superiority of artillery fire came to be looked upon as a prerequisite to the success of any infantry attack. This belief continued to be held until the Boer war demonstrated that even a weak artillery force, provided it was posted in a judiciously selected masked position, could persevere until the opening of the infantry attack.*

At **Sedan,** a group of 114 guns belonging to the Württemberg Division and to the IId Bavarian Army Corps, was posted in the south near Frésnois and fired into Sedan; another group, consisting of 6 batteries of the IVth Army Corps, was posted at le Pont Maugy and flanked the terrain north of Bazeilles. In the eastern part of the battlefield, 24 batteries belonging to the Ist Bavarian Army Corps and to the IVth and XIIth Army Corps, had crossed the Givonne valley and deluged Balan, Fond de Givonne and the old camp with their fire. Eighteen batteries of these three corps did not find room to go into position. Farther northward, 90 guns of the Guard Corps fired on the Bois de la Garenne. In the northwest, the artillery line of the Vth and the VIth Army Corps had grown to 156 guns, which directed their fire against the Bois de la Garenne and the ground north-west of the same. Thus, 540 guns, or three-fourths of all the artillery available, were in action against one and the same objective.

The latest French regulations were the first to lay down the principle that artillery should be *massed in position ready to fire.* This is contrary to the German view, which aims at the *production of a mass effect.* But the French actually aim to use only as many of the batteries held in readiness as are required to fight the line occupied by the enemy. The batteries that are not to go into position immediately, are posted, at the discretion of the artillery commander, either limbered, "in readiness" † (*position d'attente*), or unlimbered, ready to fire, "in observation"‡ (*position de surveillance*). By placing the batteries in readiness, either unlimbered and ready to fire, or limbered and available for action, the French expect to be able to use them, prepared for action as completely as possible and without waste of time, against

*Relative number of guns:

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|---|---|---|
| **Colenso,** December 15, 1899 | 5 : 44 | guns. |
| **Pieters Hill,** February 23–27, 1900 | 10 : 70 | " |
| **Paardeberg,** February 19–27, 1900 | 6 : 91 | " |

†*Bereitstellung.*

‡*Lauerstellung.*

suddenly appearing targets, or to direct their fire upon targets against which the fire of the other batteries has not as yet produced an adequate effect. This idea is by no means foreign to the German regulations.

Artillery does not depend to the same extent as the other arms upon a reserve of formed bodies. But this statement should not be confounded with the requirement to keep out of action curved fire batteries until the situation is cleared up, or to leave undisturbed the artillery belonging to intact organizations of the general reserve. To relieve silenced or disabled guns by putting in fresh guns is contrary to the nature of the arm, which is to produce an effect by simultaneously coming into action with a superior number of guns. But there is no objection to withdrawing batteries from action and to employing them at another point. The best way to get a disabled battery again ready for action is to replenish its ammunition and to make good its losses in teams and personnel. Batteries that have run out of ammunition should maintain their position as best they can under the hostile fire and should not withdraw. Even such silent batteries will not fail to produce an effect upon the enemy, as he can not fathom the reason for their silence and does not know but what they may again open fire at the decisive moment. The reserve of an artillery force does not consist of retained batteries, as in the day of smooth-bore cannon, but of ammunition columns. For, in a company or in an escadron, all the members of the organization can participate directly in the fight, whereas in a battery, this is only possible in case of the personnel directly engaged in serving the guns (about one-fifth of the effective strength of the battery). The bulk of the personnel is with the reserve and the light ammunition column. These views are not shared in Russia, whose artillery regulations, while prescribing that a superior number of guns should be brought into action at a timely moment, point out that "in a large force,

it may be advisable to keep a part of the artillery with the general reserve."

During the **Russo-Turkish war** of 1877–78, the range of the 4-pounder batteries proved wholly inadequate. They were, therefore, kept in reserve and did not get into action at all in many instances, as the fighting was carried on at too long a range. During the second battle of **Plevna,** 30 out of the 176 guns available, remained inactive in reserve. On September 10th, 1877, the Russians brought 288 field and 20 siege guns into action to prepare the assault on Plevna, and kept 186 guns in reserve.

During the **Russo-Japanese war,** batteries were, likewise, held back in reserve in many cases. The result was that the Russian artillery, though numerically stronger than the Japanese artillery, almost invariably fought at a numerical disadvantage.

In his instructions of April 15th, 1904, General KUROPATKIN expressed himself decidedly against retaining reserves composed of artillery. To quote: "For, it is better, at long ranges, to let the enemy believe that he has already gained the fire superiority. Batteries and the garrisons of shelter trenches are, therefore, not to reply to the enemy's fire at all at long ranges, but, as soon as he begins the attack, to open up a murderous fire on him, which should increase in intensity as he approaches." Later on, General Kuropatkin's views changed slightly. In an army order dated January 9th, 1905, he again emphasizes the necessity of retaining strong army reserves, and then continues: "The same is also true of strong artillery reserves. During the preparatory stage of engagements and until the most favorable target for artillery had become apparent, we kept our artillery too long in reserve and were therefore worse off than the Japanese, who put all their artillery into action."

At **Beaune la Rolande,** 6 batteries were, for a time, held in reserve at Marcilly, and on the **Lisaine,** 4 batteries were attached to the reserve.

Artillery that has been held in reserve is frequently no longer able to go into action.

At **Wörth,** the eight batteries of the French artillery reserve did not come into action until it was too late and until the remainder of the French artillery had been silenced. The tardy appearance of these forty-eight guns failed to make much of an impression on the Germans, whose skirmishers entered the batteries after the latter had fired but a few rounds. Thirteen guns fell into the hands of the Germans. The decision lay at an entirely different range than during the Napoleonic era. At short ranges, at which, in the past, artillery had very little to fear, batteries were no longer able to hold their own for any length of time, even when exposed to the fire of the needle gun only, and after the superiority of fire had once been lost it could not be regained in the short space of a quarter of an hour.

The Russo-Japanese war demonstrated the tremendous effectiveness of shrapnel fire. Shrapnel fire increased the duration of combats and compelled troops to take up extended order formations, forced advancing infantry to hug the ground, and compelled artillery to fight at long range and in masked positions. Attacks and changes of position had to be undertaken at night more often than had been originally intended. But against intrenched skirmishers or those otherwise sheltered behind features of the terrain shrapnel did not produce the expected effect.

Modern field artillery is quite a different weapon from the artillery of the past, and many hide-bound customs must be eliminated if its inherent power is to be fully utilized. The following points deserve special mention:

1. A numerical inferiority in guns may be compensated to a certain degree by an accelerated rate of fire.

2. Increased effectiveness of the individual projectile, which, when it strikes any troops in the open within a range of 4,000 m., either annihilates them in a very short time, or, at the very least, neutralizes them, i. e., robs them of unrestricted mobility. This, moreover, in effect enables artillery to "nail" hostile troops to their cover. The effect of artillery fire against troops in trenches, especially in masked trenches, is surprisingly small. Clearly visible shelter trenches, on the other hand, are not only good objectives, but serve as good orientation points.

3. Artillery has become a much more formidable foe of the infantry than it was in the past, as infantry can no longer hope to attack it frontally at short range. Shields afford so much protection to the personnel, that the artillery of the attacker can no longer overpower the guns of the defender in a short time by massing a superior number of guns against them.

4. The ability of modern field artillery to deliver effective fire from masked positions with at least some of the batteries.

The artilleryman who wishes to make the most of the efficacy of the new gun, must get into position ahead of his opponent. Masked positions generally have the advantage that preparations for firing may be made without molestation by the enemy.

## 2. THE POSITION OF ARTILLERY IN A COLUMN.

When the enemy is encountered, it is essential to success that a superior artillery force be brought quickly into action. Accordingly, artillery should be posted as near the head of the column as considerations for its saftey permit. But in so posting it, infantry units should not be unduly broken up. Since the advance guard screens the deployment for action, it is only necessary to take care that, in distributing artillery throughout the column, the leading battery be protected by infantry in its front. Depending upon its strength, artillery will usually be posted in rear of the first or second* battalion, or in rear of the leading infantry regiment of the main body. The artillery of a division takes up a front of 1,500 m., hence care must be exercised to see that the number of guns brought into action bears a proper relation to the infantry force deployed, as the latter not only protects the front of the artillery but its flanks as well. Artillery should not be posted at the tail of a column. The reserves and combat trains of the batteries march directly in rear of the last battery of their battalion. The light ammunition columns march, as a rule, in rear of the infantry and the ambulance company of the division. It is, however, permissible to have them march in the column or at the tail of the advance guard. Since the caissons are heavily loaded and, to make matters worse, are drawn in part by horses requisitioned on mobilization, it appears to be inadvisable to let them march as part of an artillery column. But, on the

*This is the better position when the main body has to change direction and throw out a new advance guard.

other hand, military history shows that in a long column, reserves separated from their batteries are very easily forced aside by other troops and are then unable to find their batteries on the battlefield.

"The battery reserves, which as a general rule follow close upon the heels of their batteries on the march and on going into action, dropped behind. This was primarily due to the fact that the heavily loaded caissons were unable to keep up with the guns on the difficult terrain that had to be crossed. After they had lost considerable distance on this account the reserves became still farther separated from their batteries by other troops pushing ahead of them, this being a natural result of the peculiar deployment of the XIth and the Vth Army Corps."

"That the second ammunition echelons of the artillery battalions that were taken out of the long route columns of two competing corps and hurried far in advance, lost touch with their battalions for several hours, seems likewise easy of explanation. At any rate, it proves the soundness of the principle that the command of these echelons should be entrusted to resourceful, energetic officers."*

During the first three hours of the fire action in which the IIId Battalion, 11th Prussian Field Artillery was engaged at **Sedan,** only a single battery reserve was available. At **Vionville,** the batteries of the 5th Infantry Division were likewise without their battery reserves and their ammunition ran very low in consequence.†

The separation of battery reserves from their batteries in the artillery of the Prussian Guard, when the latter was hurrying ahead toward the battlefield of **Königgrätz,** had a similar result.‡

A German division takes up a road space of about 10 km. Of this, 4,800 m. is required by the artillery and its light ammunition columns. The insertion of such a long artillery column on the one hand retards the deployment of the infantry units marching in rear of it, and, on the other, breaks up the continuity of the infantry column. Besides, such a long artillery column is a good objective for enterprising cavalry. This danger may be diminished by inserting platoons or companies of infantry between artillery units (par. 365, German F. S. R.,) or by splitting the artillery into several parts, one of which, usually the weaker, is assigned to the ad-

*HOFFBAUER, *Die deutsche Artillerie*, VIII, pp. 80 and 199.

†*Ibid.*, II, pp. 33, 34 and 38.

‡HOHENLOHE, *Briefe über Artillerie*, pp. 115 and 116.

vance guard, the other, stronger part, to the main body. The first duty that confronts the artillery, consists of opening the way for the advance guard and of forcing hostile advance detachments to retire on their main body. These requirements are approximately fulfilled by the following distribution of troops.*

*Advance Guard:* Three battalions of infantry; one battalion of artillery between the two battalions of the reserve; and the light ammunition column at the tail of the reserve.

*Main Body:* Two and three-fourths battalions of infantry; one battalion of artillery; one company of infantry; the second artillery regiment (one company of the second infantry brigade between the two battalions); the second infantry brigade; the ambulance company; three light ammunition columns. When a second division follows the first, it should march its artillery in rear of the leading regiment.

**Austria:** In assigning artillery a place in a column, tactical considerations are to govern. In addition, artillery may be grouped in a different manner than that laid down in the table of organization. In general, the necessity of infantry and artillery coöperating will cause all the larger columns to be provided with artillery, and even small columns to be assigned batteries or platoons. Artillery (about one-third of that available) will, likewise, frequently be assigned to the covering detachments of large columns. In small columns, however, all the artillery will march as a rule with the main body.

The field howitzer batteries should be assigned to the column that will, in all probability, require curved fire guns. In case subsequent developments of the situation can not be foreseen with sufficient accuracy at the time of issuing the march order, these batteries should be assigned to the column from which they can be most easily detached and moved to the point where their services are required. In special cases, it may be a good plan to distribute the field howitzer batteries among the various columns.

These remarks apply with equal force to ammunition columns. In general, one ammunition column is placed at the disposal of each artillery

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*The question of assigning artillery to the advance guard has been treated in various ways in our regulations. To quote:

*F. S. R. of 1895:* "As required, care being taken not to break up tactical units."

*F. S. R. of 1905:* "This is left to the discretion of the commander of the force."

*F. S. R. of 1908:* "Especially in the larger units, field artillery should be assigned to the advance guard."

regiment as a regimental ammunition column. This ammunition column usually marches in rear of all the troops, but in difficult country may follow directly in rear of the artillery.

**France:** Artillery is posted near the head of a column, but not so far forward as unduly to retard the arrival of the infantry. In ordinary circumstances, the divisional artillery of the leading division, or that part of it not assigned to the advance guard, marches in rear of the leading battalion of the main body, and the corps artillery in rear of the leading division. The divisional artillery of the second division marches between the brigades of that division. When all the artillery of the leading division is assigned to the advance guard, the corps artillery is posted farther forward in the column. The French frequently use a single advance guard battery in an endeavor to entice the enemy to show all of his artillery, against which they then bring to bear all the artillery of their main body.

**Russia:** Infantry units are inserted in the artillery column. When three batteries are attached to an infantry brigade, two of them march between the battalions of the leading regiment, while the remaining battery marches ahead of the last battalion of the second regiment.

In an infantry division (16 bns., 2 esc., 8 btrs.) on the march, the artillery is distributed as follows: ⅙ to ¼ of the artillery (2 btrs.) with the advance guard; one battalion of three batteries in rear of the leading battalion of the main body; the third battalion of artillery with the second infantry brigade. This distribution in effect provides an artillery reserve in the route column.

**Italy:** Detachments about the size of an infantry brigade do not attach artillery to their advance guards. In a division, two batteries are assigned to the advance guard and two to the main body. In an army corps, the divisional artillery is assigned to the advance guard, the corps artillery marching in rear of the leading regiment of the main body.

When a column of troops is obliged, on debouching from a defile, to deploy in face of an enemy who is already deployed, a task that confronted the Vth Army Corps at Nachod and the Guard Corps at Raatsch-Burkersdorf in 1866, it is of the utmost importance to bring a strong force of artillery quickly into position, and to that end to have it march so far forward in the column that its prompt deployment will be assured.* When the force marches on several roads, and the situation is not as yet cleared up, the artillery is usually allowed to

*For the distribution of the artillery in the column during the advance on Beaumont, see *Taktik* III, p. 271, *et seq.*

march with the unit to which it properly belongs. But it may be advisable, on the other hand, to group the artillery within the units to which it belongs, comformable to the intentions of the commander.

*Heavy artillery* usually marches at the tail of the main body in rear of the light ammunition columns of the field artillery, in order that it may not retard the deployment of the infantry. This position, so far in rear, is quite unobjectionable as a rule, since it is requisite that the situation be cleared up before the heavy batteries are brought into action. But, when their employment can be foreseen, the firing batteries should be placed far enough forward in the column (for example, in rear of the field artillery), that their timely entry into action will be assured. In many cases, nothing but the fire of these heavy batteries will make it possible for the field batteries to go into action. As the cannoneers of the heavy artillery are armed with rifles and are very numerous, it is unnecessary to detail infantry to protect it or to assist it on the march. The observation wagons usually march at the head of their respective battalions, but they (as well as battery commanders) may be sent forward, at the discretion of the commander, to the advance guard when a fortified position is to be attacked. The battery reserves of each battalion of heavy artillery march in rear of the last battery of their battalion. The light ammunition columns of howitzer battalions march in rear of those battalions. When howitzer battalions are pushed forward, these columns march either in rear of the light ammunition columns of the field artillery or in rear of the fighting troops.

Since the introdution of gun shields, advance guard artillery that is skillfully handled, is better off than formerly. By accelerating its fire, it may deceive the enemy for some time in regard to its strength and may frequently entice the enemy to reply to its fire, thereby betraying his intentions. Considering the *penchant* of our neighbors (the French) for advanced positions, the fire of such advance guard artillery

is best calculated to break down quickly any hostile resistance that would formerly have required the action of a considerable force of infantry. *Artillery fire admonishes the advancing opponent to be cautious.* Except in an advance against a hostile position that is already fortified, or over open ground entirely devoid of cover, it is always an advantage to assign artillery to an advance guard. But the artillery force in the advance guard should never be out of proportion to the infantry. If a battalion of three batteries is assigned to a detachment, it is best to keep all the batteries with the main body, in order that the battalion organization may not be broken up and that mutual coöperation may be assured. In ordinary circumstances, it is objectionable to assign artillery to a weak advance guard. In an advance guard consisting of a battalion of infantry and a battery, or about what one of our brigades would throw out during maneuvers, the battalion is practically nothing but an artillery support. The protection afforded by one or two companies of infantry marching ahead of the artillery is inadequate. The infantry marching in the lead is but too apt to find other employment that will deflect it from the road followed by the column, so that the artillery will suddenly find itself alone on the road and devoid of any infantry support. The trifling amount of time gained is not at all commensurate with the increased danger to which the battery will be exposed, especially if the terrain is unfavorable. If the enemy is encountered, deployed and in position, a battery that imprudently exposes itself in the face of stronger hostile artillery, may find itself in a tight place which may also make it difficult for the batteries of the main body to come into action.* In such a case, the advance guard battery will have to be held in rear in readi-

*In this connection, the engagement at Gerchsheim, July 25th, 1866, is particularly instructive. Twelve guns of the Prussian advance guard went into position east of the *chaussée* immediately in front of the Hochtel wood. They were at once overwhelmed by the violent fire of 40 hostile guns. As a result, they had to be withdrawn behind the wood, after a fight lasting three quarters of an hour. It was not until von Wrangel's brigade attacked, that these guns could again be brought into action. v. LETTOW-VORBECK, *Feldzug von 1866*, III, p. 349.

ness until the arrival of the batteries of the main body. In an encounter with an enemy who has already completed his deployment, there would, therefore, seem to be nothing to be said in favor of using a single battery in the advance guard, unless that battery is to serve the purpose of drawing the enemy's fire.

Those who oppose assigning a strong artillery force to an advance guard, hold that the premature action of a large number of guns is very apt to lead to haste and may unduly influence the decision of the commander-in-chief. They argue that a strong body of artillery in the advance guard requires a strong force of infantry, as the latter arm would otherwise serve no purpose except that of protecting the artillery. Strong advance guards, they maintain, are apt to succumb to the temptation to engage in independent actions or, as the saying goes, to bolt, which reacts on the main body and forces it to shape its deployment according to the tactical needs of the advance guard. They insist that this precludes a united deployment and a systematic use of the masses to accomplish the main object sought to be attained; that the principal duty of the advance guard consists not so much of combating the enemy as of clearing up the situation. They recommend, therefore, that advance guards be made weak in infantry but strong in cavalry, and that no artillery be assigned to them at all.

An infantry attack undertaken without artillery support soon hesitates and is shattered by the hostile fire. By assigning artillery to it, the commander can best stimulate the advance guard to energetic action, and by keeping all the artillery with the main body, he can best curb the ambition of the advance guard, unless he prefers to accomplish the same result by accompanying the advance guard in person. The dangers of assigning artillery to an advance guard become apparent when a completely deployed opponent is encountered in position, and the advantages of such assignment are evidenced in a rencontre. It would not be difficult prop-

erly to distribute artillery in a column if one were accurately informed, in each case, of the intentions and measures of the enemy. In order to secure the advantages that accrue from the assignment of artillery to the advance guard, it would be a good plan for the commander of an advancing division either to put one battalion of artillery into the advance guard and to send it all into action as soon as reports indicate that the enemy is likewise advancing, so as to gain, in this way, a start over the enemy in deployment, or to keep it in rear if the enemy is encountered completely deployed in position. But even in the latter case, it may be advantageous to use artillery for the purpose of pressing back the advance troops of the opponent, of capturing supporting points that lie in front of the hostile position, and of forcing the enemy to disclose his intentions.

Artillery attached to a rear guard enables the latter to keep the pursuing enemy at a distance, and to conduct an action with less infantry or cavalry than would otherwise be possible. Rear guard artillery can escape from a critical situation or regain its proper place in the column by moving at a rapid pace. The proper moment for retiring will have arrived when artillery fears to lose its mobility. Artillery remains in hand so long as the enemy does not directly penetrate into the batteries. It is always easier for artillery than for infantry to break off an action. A numerous, well horsed artillery furnishes a retiring force with the most effective means for checking pursuit and for increasing the distance that separates pursuer and pursued. It is only when the disorder among the retreating troops and the character of the ground are such as to endanger artillery, that one will of necessity, dispense with its services in a rear guard. In general, more artillery should be assigned to a rear guard than to an advance guard, but light ammunition columns, if still full, should be kept intact with the main body.

## 3. DEPLOYMENT OF ARTILLERY.

The senior artillery officer of a division, of an independent detachment of all arms, or of a covering force composed of all arms, is the commander of its artillery and accompanies the commander of the troops until the commencement of the action and receives orders from the latter in regard to the use and action of the artillery. With the approval of the commander of the troops, he then issues orders for bringing up the light ammunition columns. The ammunition columns are brought up by order of the corps commander, or, in case they are attached to the divisions, by order of the division commanders, and the commander of the artillery notified of their position. It is a good plan for subordinate artillery commanders to ride at the head of their respective commands in constant readiness promptly to obey a summons to move forward. In a division, on account of the distances separating the various elements, it is advisable for the commander of the artillery brigade to assemble his regimental commanders from the outset for reconnaissance and to keep them near his person during the advance into action. While at headquarters, the commander of the artillery has been able to watch the situation develop and the decision of the commander-in-chief take form. The entry into action is preceded by a reconnaissance of the enemy and of the firing positions. The commander of the troops must expect that these duties will be about terminated by the time the order for going into action is issued. The reports of the cavalry require elaboration from an artillery standpoint. This is accomplished by sending out artillery officers' patrols.* (Par. 154, German F. S. R.). When an advance is made against an enemy in position, these patrols may be sent ahead with the cavalry. Otherwise, it is advisable not to send them

*Militär-Wochenblatt of 1908, No. 140.—*Artilleristische Monatshefte* of 1909, II.—*Streffleur*, 1909, VIII.

out until after some inkling has been gained as to the enemy's intentions and the decision of the commander-in-chief is fixed. The necessity of reconnoitering with artillery patrols is a direct result of the fact that cavalry patrols never report accurately the very details that are valuable for the artillery. And it is not within the province of cavalry to do this. Cavalry ascertains the presence of the enemy and furnishes the commander-in-chief with an outline of the situation; the detailed information that every arm needs for its activity, it must gain for itself. Artillery, moreover, must reconnoiter to assure its own safety and to gain information in regard to the practicability of the terrain. Artillery patrols are, furthermore, to obtain information that will be of service from a purely technical artillery standpoint (reconnaissance of the objective).

The tasks of artillery patrols may be divided into two classes: (1) Reconnaissance to determine whether or not the terrain over which the artillery is to advance is passable and whether any of the positions tentatively selected on the map are suitable; (2) Reconnaissance to obtain tactical and technical information. In tasks of the first class, it is sufficient if only one man accompanies the officer, as the patrol returns to its organization upon completing its work and as it is therefore unnecessary to send back messages. Tasks of this class also include that of requesting troops marching ahead of the artillery to clear one side of the road so that the batteries can advance. Tasks of the second class are turned over to patrols consisting of a specially selected leader and a number of mounted orderlies (trumpeters) proportionate to the duty the patrol is called upon to perform. Ten mounted orderlies are attached by the commander of the troops to the howitzer battalion and remain permanently with it. Since an interruption of the reconnaissance may have the most serious effect, patrols charged with the task of obtaining tactical and technical information should be made rather strong. In many cases, one will not be able

to count upon their returning until the engagement is over. The patrol leader must know definitely whether he is to return, where he is to report upon returning, and, in case he finds hostile artillery in a certain sector, how much time he is allowed to accomplish his mission. Artillery patrols should, as a rule, avoid encounters with hostile patrols, but may, in case of necessity, use their pistols to repel such patrols.

Two batteries of the Austrian IVth Army Corps (4th Field Battery and 8th Horse Battery), which had occupied redoubt No. 3, at **Königgrätz** were surprised by infantry of the Prussian Guard Corps, because they had neglected to have their scouts observe the ravine that ran in front of their position and whose bottom was not visible from the position. Of the sixteen guns in the position, only two managed to escape.

Austrian artillery at **Tobitschau,** July 15th, 1866. See p. 210, *supra.*

The disaster that overtook the corps artillery of the IXth Army Corps, at **St. Privat,** might have been averted, or at least considerably lessened, if timely steps had been taken to reconnoiter in front and on the left flank.*

The scouts sent forward to reconnoiter the terrain should also, during the advance, direct their attention upon movements of the enemy. The commander of the artillery, whether the artillery is on the march or halted, should see to it, in order to prevent surprise, if for no other reason, that reconnaissance is kept up in front and on the flanks, and should maintain communication with the commanders that have ridden ahead. Artillery in position will in the first place send out scouts on the flanks and have them occupy any crossings over obstacles. In addition to this reconnaissance on the flanks, reconnaissance of the terrain in rear of the batteries and for protecting the reserves may become necessary. When artillery is firing from a masked position, when the guns are posted in rear of the crest of a hill and infantry support is lacking or inadequate, it will frequently be necessary to send scouts to the front. Timely reconnaissance is likewise necessary when artillery accompanies the infantry attack, in order that the batteries may not suddenly encounter

**Der 18. August,* p. 217.

the enemy and in consequence be forced to unlimber within the most effective range of his fire. The effect of modern arms is such that the artillery would certainly be annihilated in such a case.

**Examples:**

1. Collapse of the 5th Heavy Battery of the 7th Field Artillery at **Colombey.*** See p. 355, *infra.*

2. The conduct of the 2d Light Battery and the 2d Heavy Battery of the 10th Field Artillery at **Mars-la-Tour.**†

3. The surprise of the British artillery at **Colenso,** December 15th, 1899, at a range of 800—1,000 m., by the Boers, was the result of Colonel Long's decision to move his guns at a rapid gait to within 600 m. of the enemy.

It is difficult to reconnoiter the objective, but it must be accomplished. The earlier an artillery patrol is on the ground, the better its chances of observing the deployment of the hostile artillery. Artillery posted in a masked position can frequently be seen from a flank. Even a report to the effect that no artillery was found in certain localities, is often important. The enemy will not voluntarily disclose the position of his masked batteries, and infantry covering detachments will, in any case, prevent approach, so that nothing remains but to use "decoy batteries" to induce the enemy to open fire.

It is important to ascertain how many and what type of guns the enemy already has in position by the time one's own artillery goes into position. Information from which conclusions may be drawn as to the time when and the place where hostile artillery will presumably go into position (route columns and preparation of fire), is likewise of great importance. The report of the scout charged with reconnoitering an objective should contain the following information:

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*KUNZ, *Beispiele*, 7, p. 10.

†*Supplement to Militär-Wochenblatt*, 1895, p. 201.

1. Number of hostile guns and batteries; whether they are posted in observation, in readiness, or for immediate action; if the latter, whether they are posted in an unmasked, semi-masked, or masked position; the type of guns, i. e., whether field guns or howitzers; location of hostile observation stations.

2. The actual location and extent of the hostile artillery position; the location of the flanks of the hostile artillery line with reference to the line of fire and to features of the terrain. A knowledge of the frontage of the hostile artillery position is important in locating covered avenues of approach and in selecting cover. Panoramic sketches have very little value, since observer and recipient scarcely ever view the ground from the same point.

3. Intrenchments.

4. Masks, dummy intrenchments and dummy targets; the latter often betray their real character by their immobility and by the fact that even before the fight begins they are already in evidence.

When infantry is the objective, its frontage and depth should be ascertained; likewise, whether the infantry has made a lodgment within or in front of the edge of woods or villages. Special importance should be attached to determining the position of clearly visible points with reference to the target. At Magersfontain, December 12th, 1899, and at Colenso, December 15th, 1899, the British artillery fire, owing to insufficient reconnaissance, did not hit the Boer trenches at all, but, with an accuracy that even the Boers praised, did search areas that were believed to be occupied by the enemy, but which, in reality, were unoccupied. Similar cases are reported to have occurred in Manchuria.

For a discussion of the reconnaissance during an attack against a fortified position, see, p. 432, *infra*.

At **Artenay,** five batteries of the 1st Bavarian Field Artillery Regiment in position were severely bombarded by a single French battery. After some search, it was thought that this hostile battery was posted in

rear of Artenay. Later on, clouds of smoke were visible from time to time in another direction, and all the five batteries fired on the concealed battery. But when in spite of this, the fire of the French battery continued to produce losses, doubts began to arise as to whether a hostile battery was actually located in the area that was being searched. A reconnaissance made by the battalion adjutant developed the fact that the hostile battery supposedly posted in rear of Artenay, was in reality posted in another locality in a masked position, and that the hostile battery commander was using the church spire as an observation station. Further, that the clouds of smoke at first thought to emanate from the hostile artillery were caused by bursts of shells fired by a horse battery of Prince Albrecht's Cavalry Division. After this reconnaissance, the fire was directed with good effect upon the hostile battery and it was soon forced to retire.*

Assistant observers and scouts† can supplement the information available in regard to the objective, by getting closer to it, the only difficulty being that of transmitting their information to the rear. They should report the location of bursts with reference to the target, details of the latter and anychanges that occur in it. It is a good plan to have artillery officers accompany the advancing infantry.‡ It is the duty of such officers to inform the commander of the artillery how close the firing line is to the enemy and to report against what parts of the hostile position special artillery support is required.

**France:** The second ranking officer of the battalion staff is usually placed in charge of the scouts. There are three scouts in each battery. Their duty is to ascertain whether the terrain is passable and, when necessary, to leave one of their number behind to ensure that the proper road is taken by the batteries. They are to give infantry columns timely warning of the fact that artillery is about to pass, in order that the road may be

*From information furnished by Major-General Baron von Stengel, Bavarian Army, formerly an officer of the 1st Bavarian Field Artillery Regiment.—LAYRIZ, *Die Feldartillerie im Zukunftskampf.*

†**Examples:** Engagement of Chevilly, September 30th, 1870. *Geschichte des Feldartillerie Regiments Nr. 6*, p. 283.

Engagement at Villejuif, December 15th, 1870, *ibid.*

Conduct of the 4th Heavy Battery of the Guard Artillery at Le Bourget. *Geschichte der Garde-Feldartillerie*, p. 276.

‡Par. 369, *German H. A. D. R.* "Measures should be taken to maintain uninterrupted communication with the firing line. To this end, officers should, as a rule, be sent ahead. These should send information to the rear by telephone or by signals. They are to supplement the observations made from stations in rear and report, during the progress of the action, when the sheaf of fire should be shifted."

cleared. Finally, they are charged with tactical reconnaissance in action and on the march, especially when the batteries are being brought up.

**Austria** (1909):* Each battery has a reconnoitering patrol, consisting of one officer, one artificer, and two corporals. These men are to be well instructed in signalling and telephone work. The commander of the artillery directs one or more patrols to report to him. One of them usually accompanies the point of the advance guard and picks out and marks routes by means of which obstacles may be avoided. In general, the duties of artillery patrols consist of ground scouting, reconnaissance of positions and of the objective, and local reconnaissance. Battery patrols are to remain in sight of their batteries; when necessary, they are to take along a telescope; if practicable, telephone communication is to be kept up between patrols and their batteries. Patrols should make a written report accompanied by a sketch and legend. Communication is to be kept up with the infantry firing line. The patrols are to be sent out early enough to enable them to observe, from points permitting a good view, the progress of the action from the moment when the advanced troops of both forces come in contact. When a fortified position is to be attacked, it is considered advisable to send out as soon as practicable the scouts that are to reconnoiter the objective. In general, two patrols are to work together, so that observations may be made simultaneously from two points. The leader of the patrol is usually to remain pretty close to the line of march, so that he can, without delay, report any information gained to the artillery commander; he is to send scouts to reconnoiter any ground that he can not cover in person. Command is considerably facilitated by accurately defining tasks.

**England** (1908): The mounted men of the battalion staff or of the staff of the divisional artillery are specially trained as artillery patrols. They are to maintain communication between the commander of the artillery and the commander of the troops, reconnoiter positions, observe on the flanks, reconnoiter hostile positions, and observe the fire. They are also to observe the movements made by troops of their own force.

### RECONNAISSANCE DUTIES OF ARTILLERY COMMANDERS.†

The commander of the artillery should reconnoiter the position that is to be taken up, and the subordinate commanders, who bring up their respective organizations, should reconnoiter the approaches to the position. "In all reconnaissances, care should be taken to avoid drawing the enemy's attention to the position that has been selected. The artillery commanders and the mounted men accompanying them,

*Streffleur, 1909, I.

†Pars. 406–410, *German F. A. D. R.*

as well as patrols and scouts, should take advantage of any available cover. Special care is requisite in approaching the firing position. The reconnoitering commander should leave his companions behind when necessary, and should examine the position on foot." (Par. 400, German F. A. D. R.).

The hostile artillery is usually the first target. The commander of the artillery brigade should ascertain the extent of the objective or the area within which the hostile artillery is supposed to be located, so that he can intelligently assign combat tasks to his regiments and have data available for selecting covered avenues of approach. The brigade commander need not ride over the whole position, as this would only tend to retard the reconnaissance work of the subordinate leaders. As soon as a regimental commander receives his orders, if practicable before this, he should assemble his battalion commanders and have them begin their reconnaissance. It is a good plan to have the battalion commanders ride at the head of the main body. The farther they are posted ahead of their respective organizations, the more time they will have for reconnoitering.

If the commander of the artillery brigade rides at the head of the reserve of the advance guard, the leading element of the artillery of the main body will be about 3 km. in rear of him. Hence, he can expect his batteries to arrive thirty minutes after he has despatched an order directing them to advance. Orders should be promptly issued, quickly transmitted, and clear. This is essential, for otherwise batteries might stand idle in rear of the position. Regiments and battalions are assigned to definite sections for combat and for observation. Whereas it is sufficient simply to assign a regiment to a section in which it is to go into position, battalions should be given more comprehensive instructions, which should specify, among other things, how communication is to be maintained with regimental headquarters.

Each battalion commander should have his battery commanders come forward early enough to enable them to complete their reconnaissance by the time their batteries arrive. In accordance with whatever instructions he may have received from his regimental commander, the battalion commander should then indicate the general direction in which the batteries are to face, the sections they are to occupy, the objectives they are to fire upon or the areas they are to observe, and where observation stations are to be located, in case the position is masked. He furthermore should determine the manner of going into position and the kind of position, whether fire is to be opened at once by each battery or when ordered, and how communication is to be installed between his observation station and the batteries.

Battery commanders, who had best ride at the head of the battalion to which they belong, should, in the first place, make a detailed reconnaissance of the objective, or of the area assigned them for observation. Then each should decide upon the position of his battery, the formation to be employed in going into battery, and the location of his observation station. The manner of going into position pursuant to the general directions given by the battalion commander, should be left to the discretion of the battery commanders. When special directions have to be given in this regard, the necessary orders should be sent back to the officer bringing up the unit. Chiefs of platoon and chiefs of section may, likewise, be brought up to examine the position.

An officer charged with reconnoitering a position had best submit the result of his work in the form of a sketch that should, among other things, give such information as the map of the commander does not contain. It may be a good plan to attach to this sketch a profile showing estimated elevations.

The message covering the reconnaissance or the reconnaissance sketch should show:

1. How far the road on which the troops are marching can be used; where the road must be left (mile stone); and on what side of the road the artillery should march to avoid cutting infantry columns.

2. What route should be followed; whether it is possible to keep up a trot; and whether the route is sheltered from the enemy's view.

3. Location of the position, unless this is obvious from the sketch; how the artillery should go into position; any preparatory work that should be done (cutting down banks); nature of the ground; masks; observation by the enemy; and defiladed spaces.

4. How far one can see from the position; the presumable position of the hostile artillery; and whether the approaches to the hostile position are visible.

5. Where reserves and light ammunition columns should be posted.

6. Whether covering bodies are required.

**France.** The reconnaissance of the position, whether it is to be used for immediate action or for placing the artillery in readiness, is to be made by the various artillery commanders, thoroughly or superficially, depending upon the tactical situation. When the artillery is to accompany an infantry attack, this reconnaissance is to be made more quickly than at any other time. It may be advisable to employ a reconnaissance officer (*officier orienteur*), to assist a higher artillery commander. This reconnaissance officer gathers the necessary information in regard to neighboring troops, and picks out points on the map to make it easier for his chief to find his way on the ground, in order that the latter may be enabled to devote his whole attention to the tactical situation. As far as practicable, the various commanders should make their reconnaissances simultaneously. To this end, it may be advisable for battalion commanders to accompany the artillery commander in order that they may quickly bring up their battery commanders. The latter, meantime, ride at the head of the battalion to which they belong and join their battalion commander as soon as he gets orders from the artillery commander to bring his battalion into position.

The reconnaissance duties are distributed as follows:

The artillery commander reconnoiters the enemy, in a general way, the objective designated by the commander of the troops, and the position assigned to him, and divides this position up between the subordinate units. According to the situation and task as specified in the orders he has received, he designates the battalion that is to open fire first, and assigns to the other battalions (posted in readiness or in observation) areas to be observed.

The reconnaissance made by a battalion commander covers all details pertaining to the position of each battery. The battalion commander directs, when necessary, how the batteries are to go into position, indicates the battery that is to open fire first, and the position of the reserve. It may become necessary in a battalion, likewise, to keep certain batteries either in readiness or in observation.

The battery commander reconnoiters the section assigned him, with particular reference to the manner of unlimbering, to fire direction, and to observation. Artillery is to utilize roads as long as possible when approaching a position. The formations used should be those best adapted to the ground encountered and to keep the movements hidden from the enemy's view.

### SELECTION OF ARTILLERY POSITIONS.

The artillery position constitutes the framework upon which the arrangement of the other fighting forces as a rule depends.

The requirements that an artillery position should fulfill as to a field of fire, i. e., whether a good field of fire is necessary only at long ranges or also at short ranges, vary with the object in view and with the tactical situation. The nature of the ground will often exercise a decisive influence on the distance at which the artillery is posted from the enemy. (Example: Position of the batteries of the Ist Army during the battle of Gravelotte). The first consideration in selecting a position is always the attainment of the maximum fire effect.* Cover against hostile view and fire may be a prerequisite to the attainment of the superiority of fire.

Every artillery position should be reconnoitered thoroughly, but without useless expenditure of time, and with due regard to the objective and the distribution of one's own troops. But the reconnaissance can be made quickly and thoroughly and, at the same time, without attracting the enemy's attention, only if each and every leader confines himself strictly to his own affairs, i. e., if he refrains from bothering with details with which subordinates are charged, and if he sees to it that his subordinate leaders are brought up at any early moment by the shortest route to participate in the reconnaissance. The brigade commander should ascertain the extent of the objective and assign sections thereof to the regiments. As far as practicable, he should assign a separate road to each regiment.

It is particularly important that the line face in the proper direction, as a change of front interrupts the fire and in long artillery lines is difficult and entails losses. To facilitate supervision and fire direction, the batteries of a bat-

*Italy: Every position should fulfill two prime conditions, viz., it should have an adequate field of fire, and permit good observation of that fire. Everything else, even cover, is of secondary importance.

talion are separated by intervals of thirty paces, and the battalions by larger intervals, if practicable. In the larger units, however, care should be taken from the very outset, to confine the size of these intervals to reasonable limits, in order that the available room may be utilized and reinforcements come intact into the line. Whether the various batteries are posted abreast of each other or in echelon depends upon the terrain,* the probable course of the action, and the effect of the hostile artillery fire. In a battalion of artillery whose batteries are posted in echelon, fire direction must not be impaired by large intervals and distances. The danger that artillery posted in echelon runs of being enfiladed and the drawback that its batteries have but a very limited field of action, must be reckoned with. Distances should be approximately as large as intervals between batteries and intervals between guns should be decreased in many cases.

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In a large battle, it may become necessary to post the artillery in two lines. The drawbacks incident to this arrangement, such as the depth of the target offered, the difficulty of recognizing the objective, of observing the fire, of communicating between the two lines, and of supplying the first line with ammunition, must be accepted.†

*Cf., the maps of battles of the Franco-German war, showing how the formation of the ground necessitated echeloning the batteries on the Folster Heights at Spicheren, Cf., the corps artillery of the IXth Army Corps at Vernéville, August 18th, 1870; the artillery of the XIIth Army Corps at Fond de Givonne, and that of the XIth Army Corps north-east of Floing (Sedan).

†Examples: Craonne, 1814; Lovtcha, 1877. KUROPATKIN-KRAHMER, I, p. 57.

After the Prussian artillery had gained the superiority of fire at St. Privat, the artillery of the French VIth Army Corps went into position in three lines, one above the other, north of the stone quarries of Amanweiler, to cover the withdrawal of its infantry. According to MONTLUSIANT each gun had only ten rounds of ammunition available.

In a restricted sense, the position of the 3d Light Battery of the VIIth Army Corps at St. Hubert, in front of the long line of artillery at Gravelotte, may likewise be cited as an example of the employment of artillery in two lines.

The two lines of artillery should be separated according to the principle laid down on p. 343, for firing over infantry. At all events, this distribution might be found more practicable than to push batteries that arrive late on the battlefield, into the firing line by piece.

Tactical and technical considerations should be harmonized in selecting an artillery position. If these considerations conflict with one another, tactical considerations take precedence. Artillery should strive to coöperate with the other arms without hampering their freedom of movement. Since the artillery is practically acting alone, for the time being, at the opening of an engagement, the other arms should treat it with consideration and allow the batteries as much freedom as possible in their choice of position. This is specially prescribed in the Russian regulations. The infantry must subordinate its action and movements in all respects to the requirements of the artillery. This relation is reversed the moment the infantry goes into action. The artillery now becomes an auxiliary arm and must adapt itself to the demands of the infantry fight. In pursuit or retreat, it may be a good plan to despatch artillery under weak escort to gain flanking positions.

*Efficacy of fire is the principal technical requirement.* A free field of fire devoid of cover that the enemy might utilize for his advance is desirable. When firing from a masked position dead angles can not be avoided. The tactical situation determines what the extent of the free field of fire should be. Ground that slopes gently toward the enemy is the most favorable. High points that draw the enemy's fire are better suited for observation than for gun positions. The conditions for observing the fire should be good. When the sun is nearing the horizon in rear of the battery, the target will usually appear silhouetted against the background. When the sun is above the target, when the light is bright and when the sun is low, observation is more difficult and may

cause errors to be made in bracketing.* Commanding positions are desirable, as they permit the terrain in front and in rear of the objective to be observed. The hostile fire effect should be minimized. Parapets covered with sod afford the best cover. Isolated gun emplacements are apt to show and should, therefore, be made as inconspicuous as possible. This may be accomplished by connecting them with a slight parapet.

The effect of the hostile fire (see p. 223, *supra*) is reduced by ground rising in respect to the enemy's line of sight, especially if the ground is terraced, and by ground that limits the range of ricochets. Newly ploughed soil, furrows running parallel to the front of the battery and marshy ground would have this effect. Positions near walls, piles of stones, and on rocky soil should be avoided. Intervals should not be smaller than ten paces. Protection against flank and enfilading fire should be provided.

The service of the guns should be facilitated by posting them on level, solid ground.† All parts of the position should be visible to the commander, and the line of guns should not be unnecessarily irregular.

The position should be such as to enable the guns to move freely in any direction, should have covered approaches from the rear, and should enable the artillery to go into action unobserved. It should, moreover, permit each element to have its own communicating way to its reserve, so that caissons will not cross each other in coming up from the rear.

The enemy's observation of fire should be made difficult. It is desirable to prevent the enemy from adjusting his fire accurately, and to compel him to search large areas. The more inconspicuous a position is, the better. Artillery should not be posted in the vicinity of conspicuous points, especially when these are indicated on the maps.

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*This disadvantage was particularly noticeable during the battle of Colombey The lower the sun sank, the more it blinded the eyes, and made it difficult to observe the fire and to lay the guns. HOFFBAUER, *Deutsche Artillerie*, III, p. 16.

†The Prussian batteries (Vosz' and Stumpf's) posted on the Roten Berg at Spicheren. *Gen. St. W.*, I, p. 355.

Bright background—the skyline—is unfavorable, as the guns are silhouetted against it. Dark background increases the difficulties of adjustment. Batteries posted in front of woods usually betray their position by the flashes of their guns only.* It is not difficult to get the range to natural or artificial masks, but it is difficult to determine the relative position with respect to the objective of bursts visible in rear of the mask. When the mask consists of trees, the projectiles passing through frequently burst prematurely. (See p. 223, *supra*.) This is of special importance to shielded batteries posted in the open. A mask affords better protection when it runs obliquely to the front of the battery that is sheltered behind it. This is likewise true of several rows of masks running parallel to the front of the battery. Hedges in rear of which a battery proposes to take position should be reconnoitered from the enemy's side to ascertain whether there are any gaps through which the guns can be seen. Embankments one meter high, when used as a mask, will often give better protection than epaulements. Extensive grain fields in front of a battery make it difficult for the enemy to observe his fire. Dummy emplacements or objects that slightly resemble guns (heaps of fruit, clumps of bushes) frequently lead an observer astray even after he has recognized them as such. An excited observer whose mental balance has been disturbed by the heat of action and the weight of responsibility resting upon him, is without doubt more prone to make such mistakes than one examining everything calmly with practiced eye and sober judgment. During the engagement of Tashihchiao (1904), the Russian artillery fired for the first time from a concealed position. The gun epaule-

*The German Artillery Drill Regulations of 1877, par. 198, cautioned artillery not to take up a position in front of woods, because of the conspicuousness of the target that it would present to the enemy. The Russian and Italian regulations consider such a position positively unfavorable. With smokeless powder this is not true. Though "over" shots disappear in the woods and thus facilitate the enemy's adjustment of fire, it is usually impossible for him to ascertain the distance of his objective from the woods and the interval of burst, unless he succeeds in placing his bursts so that the objective is clearly defined against them.

ments constructed in plain view on the heights very naturally drew the enemy's fire.

At **Weiszenburg**, several Prussian batteries were engaged with a French battery that was masked by the trees that lined the *chaussée*.*

The position of the village of **Vionville** made it impossible for the French batteries to observe their short shots directed at the Prussian batteries posted on the hill west of the village.†

The 4th Light Battery and the 4th Heavy Battery of the 10th German Field Artillery were unable to maintain their position east of **Mars-la-Tour** under the fire of superior hostile artillery, because they were screened by the trees and the embankment of the *chaussée* that ran within thirty paces along their front.‡

At **Gravelotte** some of the batteries of the Ist Army were so posted that they could just see over the tops of the trees in the valley of the Mance brook. This explains why the hostile artillery found it so difficult to hit these batteries.¶

The cutting down of a conspicuous poplar at **Königgrätz** decreased the effect of the Austrian artillery fire, which previous to this, had caused rather serious losses.§

A similar effect was produced by tearing down a house at Lovtcha.‖

During the engagement of **Blumenau** (1866), the 2d six-pounder Battery (v. Schaper's) of the 4th Field Artillery, lost 25 men and 27 horses in its last position, because it happened to be posted on ground that was littered with a number of white stones. These attracted the enemy's attention and facilitated his ranging. The other three batteries of the reserve artillery, of which v. Schaper's Battery formed a part, lost 10 men and 10 horses only.°

Hollows in front of a battery are of special value, as they catch and hide the enemy's short salvos, upon the proper determination of which the observation of fire largely depends. Even if the smoke-cloud does not disappear entirely, it is dissipated so quickly that the target may be seen through it, thus frequently producing the optical illusion of an over shot. A low crest in front of and parallel to the battery position has a similar effect. The ineffectiveness of the British

*HOFFBAUER, *Deutsche Artillerie*, I, pp. 15 and 49.

†*Ibid.*, IV, p. 103.

‡ *Kriegsgeschichtliche Einzelschriften*, 25, p. 18.

¶HOFFBAUER, *Deutsche Artillerie*, V, p. 69.

§*Geschichte des Regiments Nr. 2*, p. 36.

‖KUROPATKIN-KRAHMER, I, p. 59.

°*Geschichte des 4. Feldartillerieregiments*, p. 194.

artillery fire directed against the Boer position at Colenso and against Lieutenant v. Wichmann's Battery at Ladysmith on October 30th, 1899, was largely due to this circumstance.

When the guns are posted on sandy soil, the blast of their discharge raises a dust cloud that dissipates all the advantages of smokeless powder. This may be obviated by wetting the ground or by covering it with canvass or with sod.

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Concealment often suffices to preclude all hostile fire effect, for an enemy who can not observe his fire can count only upon accidental hits. For this reason, masked positions are preferred to unmasked positions.* Positions may be defined as *unmasked*, *semi-masked*, and *masked*, depending upon the degree of concealment afforded.

In an **unmasked position,** the guns are not concealed from view and the line sights can be used in laying.

In a **semi-masked position,** the guns are concealed from the enemy's view, but a man standing beside a gun can still lay it for direction.

In a **masked position,** the guns are so concealed that it is impossible for the gunners to aim directly at the target.

As it takes two minutes to anchor the French field gun and as the latter, in addition, moves into position very slowly, the French prefer masked positions on principle. Depending upon the degree of concealment afforded their guns, the French describe positions by the following terms:

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**Artilleristische Monatschefte*, No. XI of 1907.—*Militär-Wochenblatt*, Nos. 14, 141, 151, 154, 157, of 1906; Nos. 15, 19, 20, 22, 30, 31, 76, 115, of 1907; Nos. 93, 143, of 1908; Nos. 9, 36, of 1909.—*Streifleur*, June No. of 1909; see also article in the February and May numbers of 1909, entitled, *Eindrücke vom artilleristischen Informationskursus.*

| | |
|---|---|
| Sight defilade (*defilement du matériel*)<br>Dismounted defilade (*defilement de l'homme à pied*) | i. e., semi-masked; |
| Mounted defilade (*defilement à cheval*)<br>Flash defilade (*defilement à lueurs*) i. e., withdrawn so far that the flash of the guns is concealed. | masked. |

Since field artillery in plain view exposes itself to annihilation,* unmasked positions are selected only when artillery accompanies an infantry attack, or when it is to sweep the immediate foreground and this is impracticable from flanking positions. Whenever the tactical end in view admits, field artillery should invariably use masked fire, just as the heavy artillery does. Heavy artillery has more freedom in choosing its position than field artillery. Effective shrapnel fire forced the Russian as well as the Japanese artillery to fight as a rule in masked positions. This was practicable because all the fighting centered around field fortifications. In spite of this, both sides felt the absence of shields. Yet even after gun shields were introduced, the value of masked positions did not diminish. Batteries equipped with shields are insensible to shrapnel fire, though their ammunition supply and their movements may be hampered by such fire.

*On June 27th, 1904, just after the opening engagements, Lieutenant-Colonel PASHENKO, Russian Army wrote the following: "The use of unmasked artillery positions is henceforth out of the question." Colonel NAMAGATA, Japanese Artillery, similarly states: "We could not post our batteries in the open, for they would have been annihilated by the Russian rapid fire guns. To post a battery in an unmasked position spells its annihilation." The following is reported of the battle on the Yalu: "All epaulements stood out conspicuously and were visible at a great distance. It is not surprising that the twenty-four Russian field guns were silenced inside of twenty-five minutes and that, when they again opened fire during the afternoon, they were silenced in an hour." The guns, it is true, had no shields, but were in pits and therefore could scarcely be said to be posted in the open. But the batteries were clearly visible and their position became accurately known when they allowed themselves to be enticed into opening direct fire on a small body of Japanese pioneers who were reconnoitering on the banks of the Yalu. During the attack on Nanshan Hill by Oku's Army, the Russian batteries posted in conspicuous positions were silenced by 7 A. M., after a bombardment lasting only one hour. At Wafangkou, the 3d and 4th Batteries of the 1st East Siberian Rifle Artillery Brigade, posted in unmasked positions, were so shot to pieces that their fragments later fell into the hands of the victorious Japanese.

If one wishes to attack a shielded battery frontally, one must employ shell or use curved fire guns. In either case, careful adjustment of fire is requisite and this can only be obtained when the target or the dust or smoke-cloud produced by the bursting projectile is directly visible, otherwise the desired effect must be produced by searching an area, a procedure that entails an enormous consumption of ammunition. The closer the guns are posted to the crest, the sooner will the fire produce results. As the Russian and the French artillery show an unmistakable preference for masked positions, we would create unnecessary difficulties for ourselves were we to attempt to fight them from unmasked positions and thereby permit them to bombard us with percussion fire. On the contrary, we must fight in masked positions and endeavor to force the enemy to leave his masked positions. Masked fire makes it more difficult to estimate the strength of the opposing artillery and, at the same time, deprives the higher commander of indications upon which he can base deductions as to the strength of the opposing forces.* This will not fail to produce an effect on a vacillating leader.

Improvements in laying apparatus also facilitate change of target. It is unquestionably a disadvantage, however, that artillery can not see the slope in front of the crest in rear of which it is posted nor keep it under effective fire. When so situated, artillery requires the support of infantry in its front. It will be difficult for artillery when in a masked position, to take a hand in the infantry combat. A battery commander† must follow the general course of the action, direct his fire on the shifting targets common to field warfare, observe its effect, and also conduct the fire of his battery. Thus arises a conflict of duties that is hard to harmonize

*Csicserics v. BACSANY, Colonel Austrian General Staff, "*Die Schlacht*," *Special Supplement to Streffleur*, Vienna, 1908. On p. 159 of this, the author relates how he succeeded in estimating the strength of hostile artillery by observing the balls of smoke of bursting shrapnel.

†Captain v. HABELMANN, German Artillery. "*Mit welchen Schwierigkeiten haben wir beim Schieszen aus verdeckter Stellung zu rechnen, und wie überwinden wir dieselben am besten.*" *Artilleristische Monatshefte*, 1908, July No. p. 37.

in actual war. If the battery commander leaves his guns to observe his fire, he can not exercise an influence on his battery; what happens when he is disabled? If he directs his battery in person, the effectiveness of his fire will depend upon the efficiency of the observer detailed by him, upon whom he must rely absolutely. The battery commander is personally responsible for the effectiveness of his battery; the maintenance of fire discipline, the exertion of every ounce of energy in critical moments, and the regulation of the ammunition supply require close communication between leader and his organization. For this reason, a single person should both conduct and observe the fire. In the French artillery, the commander is required personally to observe the fire and also to conduct it, whereas in the Austrian artillery, whenever conduct and observation of fire must be performed by two persons, the officer next in rank to the commander is charged with conduct of fire. The danger of mistakes is increased by this separation. While it can not be denied that such a procedure is practicable in a battery acting alone, it is not practicable in a long artillery line, as the observer will frequently not be aware whether the shot that he is to observe has been fired. The difficulties will, moreover, be increased when the battery commander is unable to conceal himself in rear of a mask (tree, bush) or other natural cover from the view and fire of the enemy, but is forced to kneel or lie down in his chosen station, as this naturally increases the difficulty of selecting suitable observation stations which permit a good view of the terrain. In spite of these difficulties, it will perhaps always be practicable to find a suitable observation station not far from the battery when the latter is acting alone. In Manchuria, more than two or three batteries rarely fired simultaneously from any one masked position, so that the difficulties encountered were comparatively trifling. The preference for masked positions is bound to lead to the employment of artillery in groups posted at wide intervals, but finds a limit in the restriction of frontage in

battle.* It will be comparatively easy to find observation stations for one, two, or three batteries, but not for a larger number of batteries. One will seldom be so fortunate as the Japanese were on the Yalu, where they found elevated observation stations immediately in rear of their batteries.

Conduct of fire becomes more and more difficult as the distance between battery commander and battery is increased, and it also becomes more difficult to judge the ground as it would appear from the battery. The errors that he is bound to make in determining the location of bursts on a flank of the objective, and the inaccuracy of his estimate or measurement of the difference in deflection between new targets that appear at ranges other than that to the objective fired upon previously, will be correspondingly greater. The foregoing demonstrates the necessity of providing observation wagons and observation towers on which the observer is protected by an armored shield. These observation stations however, should not be allowed to betray the position of the batteries.† Artificial means of communication are uncertain. Connecting posts and visual signals suffice for transmitting short observations. At the present time, the telephone is the most

*At the battle on the Shaho, batteries of the IIId Siberian Army Corps and of the Xth Army Corps (168 guns on a front of 14 km.) occupied an average front of 600 m. each. In 1870–71, batteries occupied an average front of 270 m. each, and at present, with a total frontage of 5,000 m. for an army corps, they occupy 180 m., each. At Tashihchiao, July 24th, 1904, Colonel Pashenko had two batteries in a position 500 m. in rear of the general line and fired against three and later on against thirteen Japanese batteries at a range of 4,000—5,000 m. On August 30th and 31st, at Liaoyang, Lieutenant-Colonel Slusharenko successfully fought with two batteries against two hostile artillery groups containing twenty-four and twelve guns respectively, at a range of 4,200 and 4,500 m. In this case, the observation station was 800 m. from the batteries. In both cases, the battalion commander, who was some distance from the guns, conducted the fire and observed its effect. Communication was kept up by means of signal flags. On August 30th, the position of the guns was betrayed by their flashes and by the dust raised by the blast of the discharge; on the 31st, the guns were so much better concealed that the Japanese had to have recourse to searching fire. v. TETTAU, *Achtzehn Monate*, I, p. 317, note * * * .

*Einzelschrift* 43–44, p. 40. See *Militär-Wochenblatt*, 1906, Nos. 50, 51, 108, and 109.

†The Rhenish Hardware Co. manufactures an observation wagon equipped with a tower 10.5 m. high. The wagon complete weighs 1,756 kg. The same firm manufactures an observation tower 5.6 m. high and equipped with armored shield, the whole contrivance weighing only 9.2 kg.

satisfactory medium for transmitting orders, but its usefulness in the noise of battle is open to serious question.* But, be this as it may, timely measures should be taken to provide a substitute for the telephone. When visual signals are used, two extra men should be detailed for duty at the observation station. Flag signals are apt to betray the location of the station, and visual signalling requires more thoroughly trained men than the telephone. In addition to communication between observation station and battery, communication with the battalion commander must be provided. Message cards pulled along a cord might perhaps suffice for this.

The necessity of masked positions must unquestionably be recognized. The difficulties encountered in these positions are not in indirect laying itself, which at long ranges is frequently much easier than direct laying, but in preparation and conduct of fire in large units.

In some test firings held in Holland, the following results were obtained: A 4-gun battery required 5, a 6-gun battery 7 minutes to set the guns parallel, 6½ minutes to adjust the fire with a single piece upon a target representing a gun, posted at a range of 3,000 m., and 8¾ minutes slow fire to verify the deflection. The fire for effect began 15 minutes after the first shot, in the case of the 4-gun battery, and 17 minutes after the first shot, in the case of the 6-gun battery. The battery commander has, in addition, the following duties to perform: (1.) To determine how far in rear of the crest he shall post his guns to ensure that the trajectories will clear the crest; (2.) To reconnoiter and establish the observation station assigned him by the battalion commander; (3.) To establish communication between the observation station and the position of the guns; (4.) To ascertain the angle of site (i. e., the difference in level between guns and target); and (5.) To ascertain the deflection for the directing gun.

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*To quote from Prince HOHENLOHE on the battle of Königgrätz (*Aus meinem Leben*, III, p. 294): "Entire teams rolled in their own blood. And the noise made by shells was so deafening that in order to communicate with anyone we had to cup our hands and yell into his ears." And on the battle of Sedan (*ibid.*, VI, p. 181, *et seq.*): "The continual bursting of shells did not fail to produce a moral effect on the personnel of the batteries. * * * Each gunner fired when he got ready; observation and correction were absolutely out of the question; soon the gunners did not even train the guns, but blazed away into the air; and with such fire it was alike impossible to hit or to impress the enemy." This battery suffered no losses.

The guns must be so posted that the trajectories will actually clear the crest. Good clearance is especially important in case it becomes necessary to fire on targets at short range.* The defiladed space in front of the crest decreases as the distance the guns are posted in rear of the crest increases.

Masked positions have the disadvantage that artillery occupying them finds it difficult to shift its fire from one moving target to another, especially when the targets are not moving on a line perpendicular to the front of the line of guns. Of course, instead of following such targets, artillery may content itself with searching a specified area.

But the disadvantages of masked positions are compensated by the following advantages: They make it possible to open fire unexpectedly, to shift guns, and to change position, and they facilitate the ammunition supply. From this it follows that artillery firing from a masked position is always under control of its leader, whereas artillery firing from a semi-masked or an unmasked position is as much out of the leader's control as deployed infantry. The greater material cover afforded artillery by a masked position is of special value, the losses of a concealed battery amounting to about one-sixth of those suffered by one in an unmasked position. The opponent will scarcely ever be able accurately to locate a masked battery either in direction or range, and it is out of the question to try for direct hits upon it.

The best masked position is one in which the battery is posted from 200 to 300 m. in rear of the crest The Russians

*"Rule for posting field howitzers model 98 (curved fire): At all ranges, no matter what charges are used, post the guns in rear of the crest a distance equal approximately to 3 or 4 times the height of that crest above the position of the guns.

"Rule for posting guns: For every meter of cover, post the guns 60 m. in rear of the crest when firing at a range of 1,000 m. (still farther to the rear for shorter ranges), 20 m. when the range is 2,000 m., and 10 m., when it is 3,000 m. or over."

When the mask is but a short distance in front of the guns, a glance through the bores will tell whether the projectiles will clear the mask. The line of sight of the gun drops below the axis of the bore by the height of a head at 100 m., by the height of a body at 200 m., by the height of a mounted man at 300 m., and by double the height of a mounted man at 400 m. If the guns are still farther in rear of the crest, one can accurately compute from the range table, at what distance in rear of the crest the guns should be posted in order that their fire will clear the crest.

consider a position 400 m. in rear of the crest as the best. A battery can usually drive directly into such a position and is therefore quickly ready to open fire. In addition, it has great freedom of movement, the supply of ammunition is facilitated, and, when necessary, it can limber up and move quickly into an unmasked position. Masked fire is preferably employed against immobile targets, or when the enemy is to be deceived as to our strength and intentions. The masked position must unquestionably be abandoned when it becomes necessary to sweep the foreground effectively, when moving targets are to be followed, or when there is likelihood of endangering one's own infantry.*

Masked fire is facilitated by posting the artillery in groups. (Par. 366, German F. A. D. R.). The advantages of this arrangement are obvious. "It makes it difficult for the enemy to determine our position and to adjust his fire, and consequently, diminishes the efficacy of his fire. It enables our artillery to bring a concentric fire to bear on the enemy, and, especially if the positions are masked, facilitates observation and conduct of fire in the various groups. In addition, the ground can be utilized to better advantage, since the various groups need not be posted on the same line."

Fire direction is the only thing that presents any difficulties when the artillery is posted in groups, for it is easier to direct the fire against decisive points and to change targets when artillery is posted in one line. Good telephone or visual signal communications (connecting posts are too uncertain), and, above all else, plenty of room, are absolutely essential when artillery is to be posted in groups. When an army corps is acting alone, there will be plenty of opportunities to post artillery in groups, but when several army corps are engaged abreast of each other, this is out of the

*On August 30th, 1904, during the battle of Liaoyang, the 3d Battery of the 6th East Siberian Rifle Artillery Brigade, "advanced from its masked position to the crest to cover the retreat of the defeated infantry. During this movement, it lost half of its personnel and was able to bring only three of its guns into action." *Einzelschriften*, 43–44, p. 38.

question. It is advisable to keep battalions and regiments intact.

At **Mukden** the artillery of the Japanese Ist Army, 130 guns, fought the Russian positions from February 26th to March 7th, 1905, from a position that was 14 km. long. The Japanese artillery was posted in five groups, as follows:

1. 4 15 cm., 4 12 cm., 14 10 cm. howitzers, and 18 mountain guns;
2. 3 batteries;
3. 4 batteries;
4. 2 batteries with a total of 8 guns;
5. 7 batteries with a total of 40 guns.

The chief of artillery of the Ist Army occupied an observation station on high ground and was connected by telephone with army headquarters and with the various groups. It is claimed that fire direction presented no difficulties on this occasion.

An unmasked or a semi-masked position should be selected when fire is to be opened promptly and when the sheaf of fire may have to be shifted quickly, especially against mobile objectives. (Pars. 367 and 467, German F. A. D. R.). The necessity of assigning several tasks to the same battery (contrary to the French practice of assigning a rôle to each group) quite naturally causes the semi-masked position to be looked upon as the principal artillery position. It has the advantage that the battery commander can direct and observe the fire from one point and that the guns can be quickly run forward to the crest, i. e., into an unmasked position. That the position be absolutely concealed from the enemy's view is of less importance than that the fire of the artillery surprise him, and that any change of target be effected promptly and without loss. It is particularly fortunate for the German artillery that in fixed ammunition, the flash of discharge has been largely eliminated.

It is absolutely essential that nothing be done that might give the enemy an idea as to the direction in which our guns are posted. To this end, due care should be exercised in reconnaissance and in moving into position; when there is

dust, the guns should move at a walk and should be unlimbered and run noiselessly into battery by hand. When time admits, the initial direction may be given to one of the guns by means of the extension sight, and the other guns laid parallel. If there is any chance of dust being thrown up by the blast of discharge, the ground should be wetted down in front of the muzzles. Cover should be utilized and the position should be as inconspicuous as possible. Artificial cover should be constructed when necessary.

In order to enable it to go into action promptly and suddenly, artillery may be posted either *in readiness*, or *in observation*. When posted in readiness, the guns are not unlimbered, but posted immediately in rear of the prospective position. When posted in observation (*position de surveillance*), the guns are unlimbered and posted either in a masked position or immediately in rear of the selected position. The principal thing is that artillery be actually concealed until the moment for opening fire.

Guns are posted in readiness when there is still doubt about the position and front to be occupied. No hard and fast rules can be laid down as to the formation that batteries should use when posted in readiness. When the ground between the locality where the guns are posted in readiness and the position they are eventually to occupy is visible to the enemy, one will frequently have to be satisfied with a reconnaissance made from a flank or even from some point in rear. If such is the case, the batteries should, at a prearranged signal, move rapidly straight forward into the position. It may be a good plan to countermarch and to execute "action rear," so as to get the limbers quickly under cover. The closer the guns posted in readiness are to the position they are to occupy, the less occasion there is for moving them forward at a gallop. When they are very close to the firing position, they should be run up by hand. On roads, in rear of farm buildings and patches of timber, route column will frequently be the most judicious formation for a battery

posted in readiness, and line of route columns at reduced intervals, for a battalion. But, whatever the formation, everything is prepared for action, the guns loaded, quadrants and sights removed from their cases. In addition, while the men bring up the guns, the target may be pointed out to chiefs of platoon and chiefs of section provided this can be done without attracting the enemy's attention.

In a battalion, a position in readiness is taken up only when ordered by the battalion commander, but the method of unlimbering is left to the discretion of the battery commanders.

It will frequently be easy for two of the batteries of a battalion to go into position, while the third battery will encounter difficulties. In such a case, especially if but few objectives present themselves, it will be a good plan to move two of the batteries into position and to have them divert the enemy's attention from the third battery, which can then move forward rapidly as soon as the other batteries have adjusted their fire.

When posted in observation, preparatory to occupying a semi-masked or unmasked position, the guns should be directly in rear of that position. Care should be taken that the men who draw the guns into battery with the prolonge do not expose themselves. When the terrain is open, a few batteries will often be held in readiness while others are already posted in observation. The time until fire is opened is used to make preparations for firing (reconnaissance of objectives, determination of firing data).

Contrary to the practice of field artillery, heavy field howitzers fight almost invariably in masked positions. This enables them to open fire suddenly when least expected, prevents the enemy from locating them without considerable trouble, prevents him from ascertaining their numbers and the intentions of their commander, simplifies ammunition supply and facilitates changing position. Heavy flat trajectory guns that are to fire on mobile targets are almost

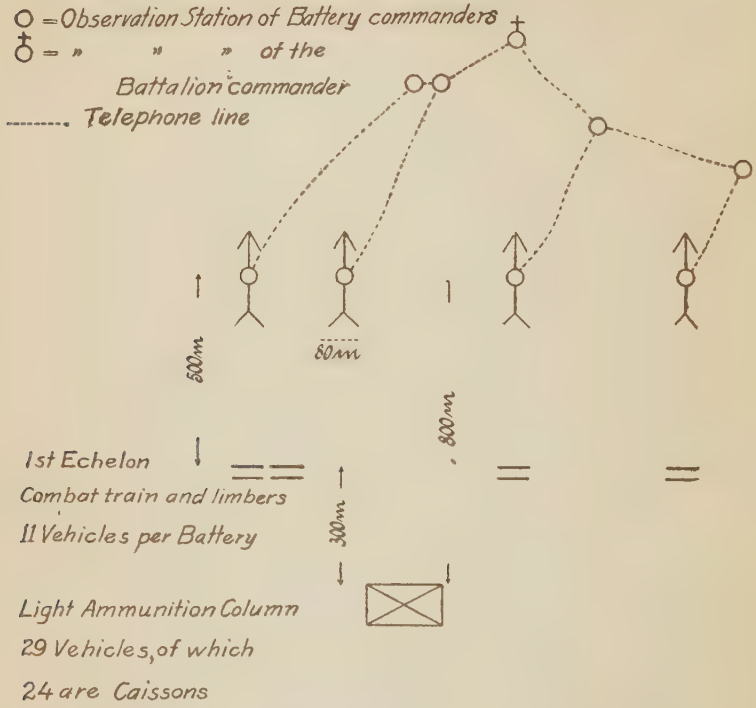
invariably forced to fight in semi-masked or in unmasked positions.

Heavy artillery will usually go into position in rear of the field artillery. It may often be desirable to have it go into position early, to enable field artillery to go into action under cover of its fire. It is important to select observation stations (pars. 359, 361, and 362, German H. A. D. R.) at inconspicuous points as close as possible to the batteries, but outside the limits of the probable zone of hostile searching fire. In order to minimize the effect of the hostile fire, unmasked observation stations should be placed at least 25 m. apart and masked observation stations at least 10 m. apart. Platoon and battery commanders' stations should be established according to the same principles. The character of the soil is of even greater importance than in the operations of field artillery, and special precautions should be taken to prevent throwing up dust. It will sometimes be necessary to take up a position in timber. In this case, the difficulties encountered in moving into battery and in supplying ammunition make it desirable to locate the position as close to a road as possible. All routes of approach should be carefully reconnoitered. Covered avenues of approach are important when the position lies within the zone of hostile shrapnel fire.

A position is taken up about as follows (pars. 304–313, 320–322, and 422, German H. A. D. R.): The battalion commander, who up to this moment has accompanied the commander of the troops, sends for his battery commanders and informs them of the situation and the purpose of the action, and indicates the general direction of the fire and the approximate location of the observation stations. He likewise designates the direction in which each battery is to face and the front each is to occupy; gives orders for going into position, for protection of the batteries and for opening fire; and, when necessary, indicates where the reserves are to be posted. The assistant observers (non-commissioned officers) establish the observation stations and the telephone squad

lays the telephone line. Each battery is brought into its position by its commander or by its senior lieutenant.

The ammunition is deposited near the guns and the limbers and caissons move about 500 m. to the rear and take




up a concealed position. Here they may be joined by the combat train and by the reserve. The light ammunition columns move up and take post about 800 m. in rear of the guns.

### ADVANCE TO AND OCCUPATION OF THE POSITION.

At the same time that the commanders of the various artillery units are ordered forward, the batteries are usually directed to take up the trot, pass the infantry, and move forward to a certain point, or along routes previously reconnoitered. The commanders of the various artillery units

can not look after all the details and, in addition, they remain in the selected position, so that much must be left to the discretion of the officers left in charge of the units.* It is especially important that cover be utilized, that communication be kept up with the battery commanders, who have preceded their batteries, that steps be taken to assure the security of the batteries during the advance, and that a reconnaissance be made to ascertain whether the ground is passable. All artillery commanders, from the battalion commanders up, should remain in the proposed position in order that they may be able to keep the enemy and friendly troops in view, as the situation may change before the batteries arrive and the selected position would then no longer be suitable. A battery commander, on the other hand, should remain responsible for his unit, for he is better fitted than anyone else to help it over difficulties. He may, therefore, find it necessary to ride back to meet his battery and personally lead it into the position.

The roads should be used as long as possible, as the difficulties encountered when moving across country may considerably retard the advance. It is a good plan to advance simultaneously along parallel roads. It is seldom practicable to shorten the column by forming the command in double column, because, in the first place, the batteries will have to trot some distance to pass the infantry.† The artillery scouts are charged with the duty of ascertaining whether the ground is passable and the reconnaissance made by the other arms does not exempt the artillery from the responsibility of protecting itself against surprise by taking proper measures on its own account. When advancing to the position, special attention should be paid to the use of cover. To this end, it is generally advisable to move in route column until near

*At Wörth, the batteries of the IId Heavy battalion of the 5th Field Artillery lost touch with their battery commanders, who had ridden ahead. *Geschichte des Feldartillerieregiments Nr. 5*, p. 59.

†When the route of an artillery column crosses that of an infantry column, the latter passes in small bodies through gaps between artillery units and even through those between guns.

the position. (See p. 265, *supra.*); but it is not necessary nor advisable to adopt any uniform procedure.

The gait depends upon the intentions of the commander, the tactical situation, and the character of the ground. The horses have not done their part, until they have brought the guns into position, even if it takes the last ounce of energy that is in them. Batteries should move at the trot, as a rule; at the walk when crossing bad places; at the gallop for short distances to hasten the advance, or to pass quickly over ground exposed to view or fire of the enemy. When used for any length of time, the gallop is apt to lag and comparatively little of gained by using it. In order that the battery may be brought in good order and with certainty into its appointed position, it may be advisable to move it at a slower gait the last part of the way. In dry weather, provided the tactical situation admits, it is a good plan to move into position at the walk, so as not to betray prematurely the presence of artillery by throwing up dust.

Special efforts should be made to bring artillery secretly into position, unless the situation demands great haste, and to open fire suddenly and unexpectedly. The secret occupation of a position loses in value, however, when parts of the artillery were obliged to expose themselves to the enemy's view during the advance, or when dust betrays the movement. The retardation due to secretly occupying a position may even have a deleterious effect. Therefore, when cover is lacking, rapidity of movement must compensate for the lack of secrecy in occupying the position.

The manner of moving into position and of unlimbering may be determined by answering the following question: "Does the tactical situation demand prompt action; is haste necessary or is it better to go into position only after thorough preparation, even if the occupation of the position is delayed thereby?" It will depend upon the answer to this question whether one moves into position openly as fast as the horses can go, or whether one utilizes all available cover, unlimbers

under cover, and has the guns run up by hand. (See p. 269, *supra*.). When the enemy is already in position, preparations should be made to cut down as much as possible the time between the appearance of the battery and the opening shot, and to avoid assembling a lot of men and horses in the battery position. When it is desired to put a superior number of batteries into position, to have them open fire simultaneously and to maintain order and coolness when they move into the initial position, it will be advisable, unless haste is requisite, to place the batteries in readiness first. The advance of batteries into a position is often facilitated by the fact that the fire of other batteries diverts the enemy's attention, or that the movement is made under cover of the fire of heavy batteries.

When a large unit has to unlimber to a flank (especially on debouching from a defile or after turning off a road) the leading elements should be assigned the longer routes. It is much simpler, to be sure, to post first the battery whose flank will rest on the road and to bring the others into position successively, but the battery at the tail of the column will not then be ready to fire nearly so soon. Since the leading battery will be ready to fire much sooner, this leads, especially during peace maneuvers, to a second still greater mistake, viz., opening fire by successive units. This mistake, which may imperil the deployment of the entire artillery force, does not, indeed, exact its penalty during peace maneuvers, but may lead to great inconvenience and serious losses in actual war in case some of the batteries are still marching in rear of the batteries that are already engaged.

## 4. BATTLE RANGES.*

Artillery fire should be utilized to the fullest extent at ranges that lie outside the zone of effective infantry fire. It is in exceptional cases only that artillery will fire at the extreme ranges laid down in its tables of fire. But such fire may be used in containing actions, occasionally in rencontre fights, in defense, to force the enemy to take cover and to compel him to make wide turning movements, and in pursuit, to disperse distant hostile troops. At extreme ranges, observation is difficult and the effect of percussion fire is small. Besides, the striking energy of shrapnel bullets diminishes more and more rapidly as the range increases.† For the foregoing reasons, artillery should fight at ranges at which an effect commensurate with the expenditure of ammunition may be expected.‡ Percussion fire produces very little effect at ranges over 3,500 m., as the projectiles bury themselves in the ground and a large part of the explosive

*Pars. 435–466, *German F. A. D. R.*

†In addition, the depth of the beaten zone decreases rapidly from the moment the angle of the cone of dispersion becomes smaller than the angle of fall of the projectile, since the upper half of the sheaf of shrapnel bullets will no longer ascend. When firing on low targets, errors in adjustment make themselves more and more seriously felt as the angle of fall increases. Such errors may, under certain conditions, nullify the effect.

‡During the Franco-German war, 2,500 m. was the longest effective range' but on August 16th and 18th, 1870, this was frequently exceeded by some 500 m. On August 18th, the 1st Battery of the Field Artillery Regiment of the Guard even fired at 4,000 m.

Engagement of Lagulin, July 31st, 1904: Two Russian batteries that had been under fire for twelve hours, received shell fire from five Japanese batteries at ranges of 4,600 and 5,400 m. One of the Russian batteries lost 2 men killed and 7 men wounded, the other only 2 men wounded, although the projectiles burst incessantly among guns and caissons. The observation station was close to the battery. v. TETTAU, *Achtzehn Monate*, I, p. 219.

At Wafangkou the artillery fired at 4,200 m.; at Tashihchiao, the 9th Artillery Brigade fired with fuzes set at the extreme graduation, and the 1st Brigade even exceeded this; and Colonel Slusharenko's artillery fired at 4,300 m. on August 30th and 31st, and at 5,300 m. on October 12th.

**Russia:** The best ranges as far as effect is concerned lie between 1,070 and 2,500 m. In attack, the first positions selected are to be located between 2,500 and 3,000 m.

**Italy:** The range should not exceed 3,000 m. If it can be avoided, no position that lies within the zone of effective infantry fire (under 1,200 and 1,500m.) should be selected.

effect is dissipated. Such fire is effective against artillery at 2,200—2,300 m. Shell bursts on graze. At a range of 3,000 m., the effect of time shrapnel against any target is considered very satisfactory, and at ranges under 2,500 m., its effect is actually annihilating. Its effect does not increase materially as the range decreases. Bad roads and the desire to open fire at an early moment, may justify firing at the longer ranges. Artillery should not take up a position at extreme range from its objective. When the guns have a better range than those of the enemy, it may be a good plan to take up a position outside the zone of his effective fire. The Japanese artillery, which was numerically and ballistically inferior to the Russian artillery, always preferred to keep out of reach of the latter's time fire and, on the plains of Manchuria, fought almost invariably in widely dispersed positions and at long ranges (3,000—4,000 m., and occasionally even at 6,000 m.). Since it seemed dangerous to the Japanese artillery to change position, the Japanese infantry finally had to get along as best it could without artillery support. As the battle progresses, the ranges must of necessity decrease. It may be laid down as axiomatic that one's own infantry should never be without artillery support. Artillery can do justice to its duties and receive the full protection of the other arms only if it keeps close to its infantry and understands how to adapt itself to the changing phases of the combat. At the decisive moment, artillery should not shrink from the severest infantry fire. A battery that has fired with annihilating effect for five minutes at a decisive point and is then captured, will have done more for its side than ten batteries that have kept up a well-aimed, but less effective fire from very distant well-chosen positions.

During the **Russo-Turkish war of 1877-78,** the Russian artillery fought at unusually long ranges and almost invariably neglected to support the infantry attack by occupying positions nearer the enemy, in which it would then have been exposed to losses occasioned by infantry fire.

At **Lovtcha,** 92 Russian guns failed to silence 5 Turkish guns. The artillery fired at a range of 4,000 m. After the capture of the Turkish

advance position on the Red Hill, only a single battery was brought up into this position, though it was the first from which effective fire could have been brought to bear upon the enemy. "Unfortunately, the Turkish rifles, effective up to 2,000 m., caused many of the commanders to come to the erroneous and disastrous conclusion that artillery neither could no should appear within the zone of effective rifle fire."*

At **Plevna,** from September 7th to 11th, 1877, the Russians had 400 field and 20 siege guns in action against 60 Turkish guns, but were able neither to silence them, nor to shake the defenders. The ranges ran all the way from 2,000 to 3,600 m., although orders had been issued that the 9-pounders, which were almost the only guns that produced any effect in this instance, should not fire at ranges over 2,400 m. Three batteries of the 16th Brigade even fired at 3,000 and 4,000 m., and, on account of the large angles of elevation used, four guns damaged their carriages and were disabled. "Severe losses occasioned by rifle fire," induced three other batteries of the same brigade to evacuate their position, which was somewhat more advanced. The severe losses (*sic*) in this case, amounted to 2 officers and 18 men.

During the attack on **Gorni Dubniac,** the artillery of the Guards showed some sound tactical sense when it went into action at the outset at close range and endeavored to support the infantry.

**Heavy Artillery** (pars. 396–399, German H. A. D. R.). The employment of heavy artillery is governed by the purpose of the action, the terrain, and conditions of observation, as well as by the necessity of coöperating with the field artillery. Thanks to the aid afforded by its excellent instruments for observation, long range fire presents no difficulties to heavy artillery. The battle ranges of heavy howitzers lie between 2,100 and 5,000 m. It is not advisable for these guns to approach closer than 4,000 m. to a target, since the effect of hostile shrapnel fire must be considered. Except at ranges of 2,100 m. and over, shell with delay action is incapable of penetrating the cover that is usually employed in the field.

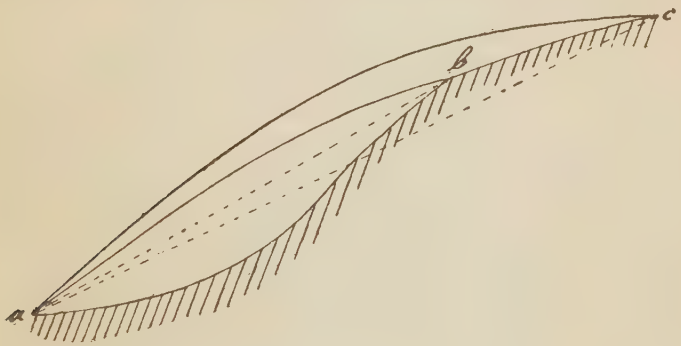
Heavy artillery should go into action at longer ranges when it is to facilitate the advance of the field artillery to effective ranges.

*KUROPATKIN in the *Russian Gen. St. W.*, I, p. 18.

## 5. FIRING OVER FRIENDLY INFANTRY.*

The increase of artillery in all units does not permit gaps to be left for it in the firing line. Besides, artillery requires the protection afforded by advanced infantry, in order that it may be enabled to devote all of its energy to its principal task. Hence, it is necessary for artillery to fire over friendly infantry.

It is impossible to specify definitely the ranges at which firing over infantry is permissible. At Pieters Hill (1900), the British infantry was told to advance until it could smell the fumes of the Lyddite shells. Colonel Kitchener is said to have told his artillerymen that he would not censure them




if two or three of their shrapnel burst in the ranks of his infantry. Curved fire guns can, at any rate, continue their fire longer than flat trajectory guns, but it must be remembered that the infantry may be endangered by shell fragments that fly to the rear. The character of the terrain and the feasibility of observing the fire will govern in each individual case; the leader must decide, in view of the tactical situation, whether it is permissible to continue the fire according to the experience gained at target practice, or whether the fire should be discontinued. Even under most unfavorable con-

*Par. 375, *German F. A. D. R.*

ditions, artillery can continue to fire longer over the heads of friendly troops when it is posted on low ground and its objective is on high ground (line a-b in the figure), than when both are situated in a plain. But this becomes impossible when the objective is at c (figure) for example. In the latter case, the artillery would have to change position. Artillery may endanger its own infantry when the light is poor and it can no longer distinguish friend from foe on account of their neutral tinted uniforms.*

Infantry posted in front of artillery must be protected against hostile shots that burst short and against the effect of projectiles that burst in the guns. Such premature bursts occur very rarely—only about one projectile (shell or shrapnel) in 8,000 bursting before it leaves the gun. These projectiles are not effective, however, up to 400 m.† In any event, the distance between infantry and its artillery should be such that the hostile artillery can not fire effectively upon both at once, i. e., at least 300 m. When it is impossible for the batteries to adjust fire by getting an "over" and "creeping" back, they can fire for adjustment over their infantry on level ground so long only as the shirmishers have not approached closer than 500 m. to the objective. For effect, they may fire until the skirmishers are within 300 m. from the target. It should be borne in mind that when a projectile passes less than 10 m. above a man's head, the atmospheric disturbance is very unpleasantly noticeable. With German field guns, firing at a range of 1,500 m., this occurs when the infantry is 300 m. from the objective; at a range of 2,000 m., when it is 250 m. from the objective against which the fire is directed. Either of these distances (300 or 250 m.) exceeds the depth of the entire (100%) zone of dispersion of projectiles (which at 2,000 m. amounts to 136 m.),

*Artillery of the Ist Army on the evening of August 18th, 1870. HOFFBAUER, *Deutsche Artillerie*, V, p. 126.

†According to Austrian data, the proportion of premature bursts to rounds fired is as follows:

1 to 303 shell (.33%)—effective up to 240 m.

1 to 175 shrapnel (.57%)— effective up to 800 m

and of points of burst (120 m.), so that the infantry skirmishers are not in danger of being hit, unless gross mistakes are made by the cannoneers. In certain circumstances, the fire may be continued with percussion projectiles, whose points of burst are more easily observed with reference to one's own infantry. The objection that friendly infantry might be demoralized by projectiles that pass over it, is not well taken; on the contrary, all shots so fired in action, will be considered a welcome assistance. But it is otherwise when the artillery fires by mistake into its own infantry. Then there happens what is so aptly described by Hohenlohe when he says, "To be sure, the men did not think of flight, but they were paralysed by that feeling of despair that takes hold of a man when he must admit that the game is up."

To quote from the German General Staff Account of the Franco-German war:* "The increased losses inflicted on the artillery by rifle fire, urgently demand that adequate protection be afforded that arm by pushing infantry to the front." The 33d and the 60th Infantry occupied **Gravelotte** and the Ist Battalion, 67th Infantry, Malmaison, to protect the artillery of the Ist Army, but as these organizations were almost on line with the artillery, the latter suffered from the fire of French skirmishers lodged in the edge of the woods. Efforts made to dislodge them precipitated an infantry fight.† At St. Ail (August 18th, 1870), the artillery of the Prussian Guards was several times forced to turn from the hostile artillery and against bodies of French infantry that had molested it, until finally some infantry that was pushed to within 400 paces of the hostile lines, supported it.‡

According to HOFFBAUER,¶ artillery fired on its own infantry: In trying to fire over the latter when in close country the two opposing lines were not clearly distinguishable on account of dust, powder smoke, or bad light; during pursuits when isolated disordered bodies rushed after the enemy; and in enveloping attacks reaching far around the enemy's flank (attack on the trenches at Gorni Dubniac);⁂ finally, in bringing up batteries out of a route column to reinforce artillery that is already engaged with hostile batteries that can not be clearly recognized on account of the nature of the terrain, or perhaps are entirely hidden from the view of the

*_Gen. St. W._, II, p. 924, résumé of the results of the battles around Metz.

†MOLTKE, _Krieg von 1870–71_, p. 55.

‡_Gen. St. W._, II, pp. 747 and 771.

¶_Deutsche Artillerie_, V, p. 216.

⁂PUSYREWSKI, _Russische Garde_, p. 130.

artillery units in rear. This actually happened to the artillery of the XIth Army Corps at **Sedan.***

The following statement appears in a British Memorial on the lessons of the war in the Far East: "The moral effect produced by artillery fire, which forced the defenders to take to cover and did not even permit them to raise their heads above the parapet, was so highly esteemed by the Japanese infantry, that it requested the batteries to continue firing, without regard to the losses thereby inflicted in its own ranks, until it had taken the position or unfurled small national flags as an indication that fire support was no longer needed. According to the opinion of the Japanese themselves, the losses inflicted in their infantry by their own guns were insignificant in comparison to the losses that the defender could inflict by delivering his fire undisturbed at a range of a few hundred meters when not kept down by the attacking artillery."

When the infantry wishes the fire to be still more effectively stifled, it should give the signal *gv*, whereupon the artillery will direct its percussion or time fire upon the ground in rear of the hostile position in order to prevent or to interfere with any movement on the part of the hostile reserves. It is often not easy for artillery to decide when it should cease firing or when it should change targets. If this is done prematurely, the enemy will get an opportunity to bring a heavier fire to bear on the infantry, which is now thrown on its own resources;† if it is done too late, the advance of the infantry will be facilitated for the time being, to be sure, but bodies of infantry that rush forward on their own initiative are very apt to run into the fire of their own artillery, as happened during the assault on St. Privat.‡

*HOFFBAUER, *Deutsche Artillerie*, VIII, p. 78.

†HOHENLOHE, *Militärische Briefe*, II, p. 87. Attack on Villejouan, December 10th, 1870. *Wald und Ortsgefecht*, p. 212. The Russian assaults on Plevna likewise failed because the hostile fire was no longer kept down.

‡*Geschichte des Kaiser Franz Garde-Grenadier-Regiments*, p. 113.

During the assault on Ste. Marie-aux-Chênes, the batteries on the right wing were notified that the infantry was about to advance to the charge. Only one battery on the left wing kept up its fire and did not cease firing until informed that the village had been taken.*

**France:** All the ground for a distance of 500 m. in front of the guns is considered within the danger zone. When the infantry has arrived within 500 m. of the objectives upon which the artillery is firing, the fire of the latter should be entirely discontinued or suspended.

**England:** It is risky for artillery to fire over friendly troops at ranges under 1,400 m., and at longer ranges, on level ground, when the infantry is 600 yards, or in the case of heavy artillery 800 yards, from the objective. When the enemy occupies commanding ground, the fire can be kept up much longer. Field howitzers can continue firing with lyddite shell even when it would be dangerous to fire shrapnel. The responsibility for discontinuing the fire at the proper moment rests upon the artillery, the other arms must assist.

**Italy:** Artillery is always to be protected by infantry pushed at least 300—400 m. to the front. This infantry should advance far enough to enable it to inflict losses on any hostile infantry that attempts to molest the artillery.

**Russia:** The following is taken from one of General Gurko's orders: "Artillery can be most useful to the attacking troops by firing as vigorously as possible when the infantry fire usually dies down, especially during the attack proper. In this case, artillery should not shrink from firing over its own infantry."

*Combat Regulations* par. 48: "Artillery should avoid firing over other troops, but may do so when the distance to the enemy is still so great and the corresponding angle of fall of the projectiles so large that there is little probability of accidents, and when the use of artillery fire may materially contribute to gaining the object in view."

**Examples of artillery firing over friendly infantry:**

**Wörth** (Gen. St. W., I, pp. 229 and 285): After the reverse suffered by the Vth Corps, the offensive movement of the French infantry was brought to a halt by the fire of the Prussian artillery. The range was 1,700—1,800 paces and Prussian skirmishers were in position 200—300 paces from the target.

**Spicheren:** (See Gen. St. W., I, pp. 313, 330 and 364).

At **Gravelotte,** 20 batteries fired for five hours over the almost entirely disorganized VIIth and VIIIth Army Corps, thereby enabling the infantry to hold its position on the left of the Mance valley.

*Gen. St. W., II, p. 759.

**St. Privat:** When the skirmish lines of the Prussian Guards had advanced to a point some 400 or 500 m. from St. Privat, 16 Prussian batteries posted 700 paces farther in rear and on lower ground, fired over their heads.* The 1st Infantry Brigade of the Guards and the skirmishers of two Saxon regiments, supported by the fire of 12 Saxon batteries posted 700—800 paces directly in rear of them, advanced to the assault of St. Privat.†

During the **Russo-Japanese war,** the first assaults on **Nanshan Hill** failed because the Japanese artillery discontinued its fire too soon. The attack made by the 4th Regiment of Guards on October 13th, 1904, and the assaults on redoubts 16 and 17 at **Mukden** succeeded, because the artillery kept up its fire to the very last.‡

## 6. ARTIFICIAL COVER.

Even in the days when guns were not provided with shields, it was found that battery matériel was not easily damaged and that batteries whose fire was silenced, were in most cases reduced to that state not because their guns were disabled, but because they were short of men and ammunition. Losses among the teams may deprive batteries of mobility, but the horses can be protected as much as possible by sending the limbers to the rear, and by unhitching the caissons. When batteries advance with infantry and support it during the assault, the limbers should remain with their guns, no matter what losses are suffered in consequence.

At the battle of **Vionville,** August 16th, 1870, a number of batteries lost a large part of their officers (14 batteries of the IIId Army Corps, 24, those of the Xth Army Corps, 13 officers) and three-fourths of their cannoneers. As a consequence, many guns had to cease firing until reinforcements came up from the second echelon.

At **St. Privat** the artillery of the Guard Corps lost one-fourth of the horses and one-fifth of the men with the fighting batteries. Killed and wounded should be removed from the batteries, as their presence lowers the morale of the personnel.

Our losses in matériel were not serious, but, at the same time, the damage done to it by the French artillery was not inconsiderable. Fourteen Prussian guns were disabled during the Franco-German war, and six during the campaign of 1866. On August 16th, 1870 (**Vionville**), the

*Gen. St., W.* II, p. 875.

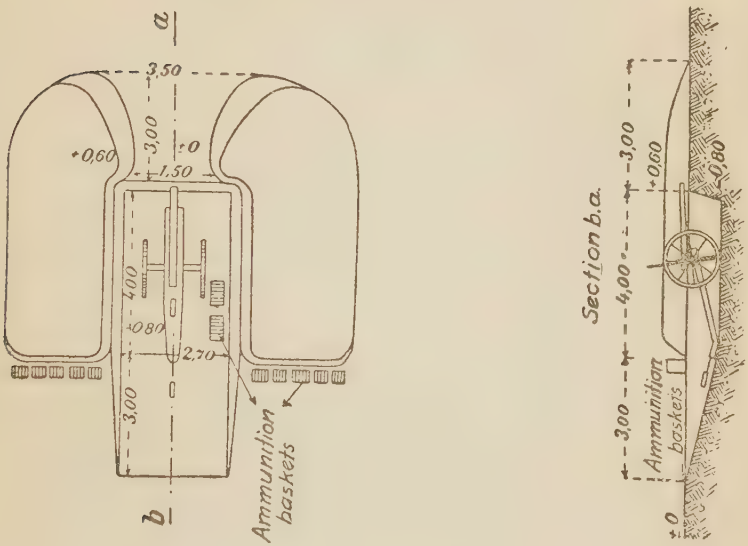
†*Ibid.*, II, p. 889.

‡v. LÜTTWITZ, *Das Angriffsverfahren der Japaner*, pp. 25–48.

following damage, minor mishaps excepted, was done to the German artillery (222 guns): 6 trail flasks, 2 primer boxes, a number of poles, 1 limber chest lid, 1 limber chest, 2 limbers, 1 axle seat and the laying gear on one gun.

### Gun Pit for Field Gun, Model '96 (remodeled).

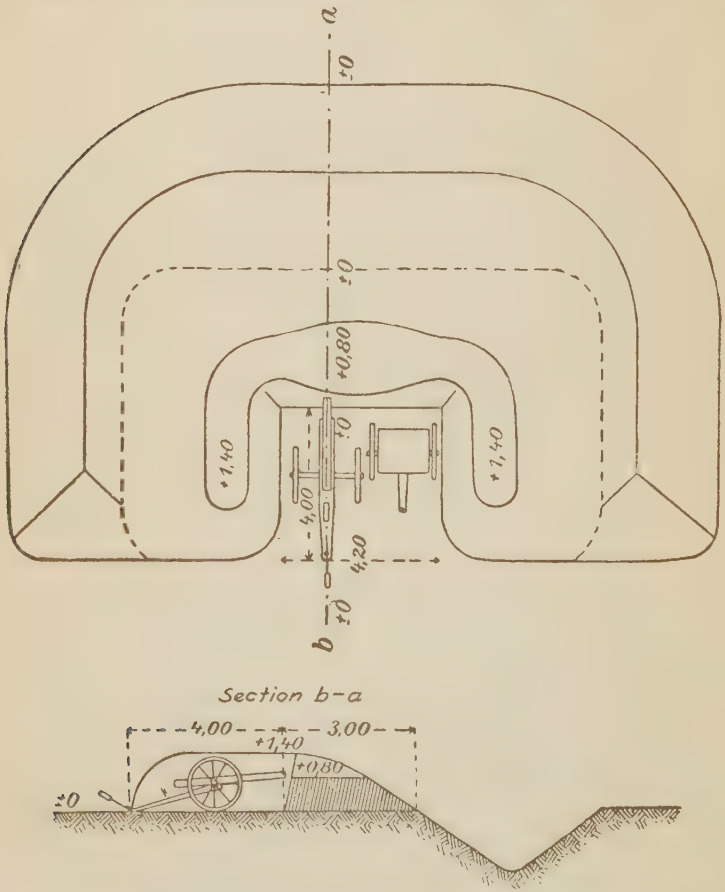
**(Time of construction: 2 hours).**




The cover afforded by the shields of the field gun should invariably be augmented by earthworks (pars. 88–102, German Manual of Field Engineering). The space between the shield and the ground should, in the first place, be filled with earth. During pauses in the firing, an epaulement 0.8 m. high can then be thrown up to give additional protection to the gun and its caisson body, the necessary earth for this being obtained by excavating a ditch in front. In case of frontal fire, the ditch should be located on the side of the gun on which the caisson body is not posted. When time admits, separate cover should be provided for each gun. In this case, ammunition is deposited beside the guns and the caissons with-

drawn. Care should be taken to provide shelter for the observation stations. In prepared positions, several sets of gun pits are requisite, since the artillery will seldom be able to meet from a single position all demands made upon it. When

**Epaulement for Field Gun, Model '96 (remodeled).**

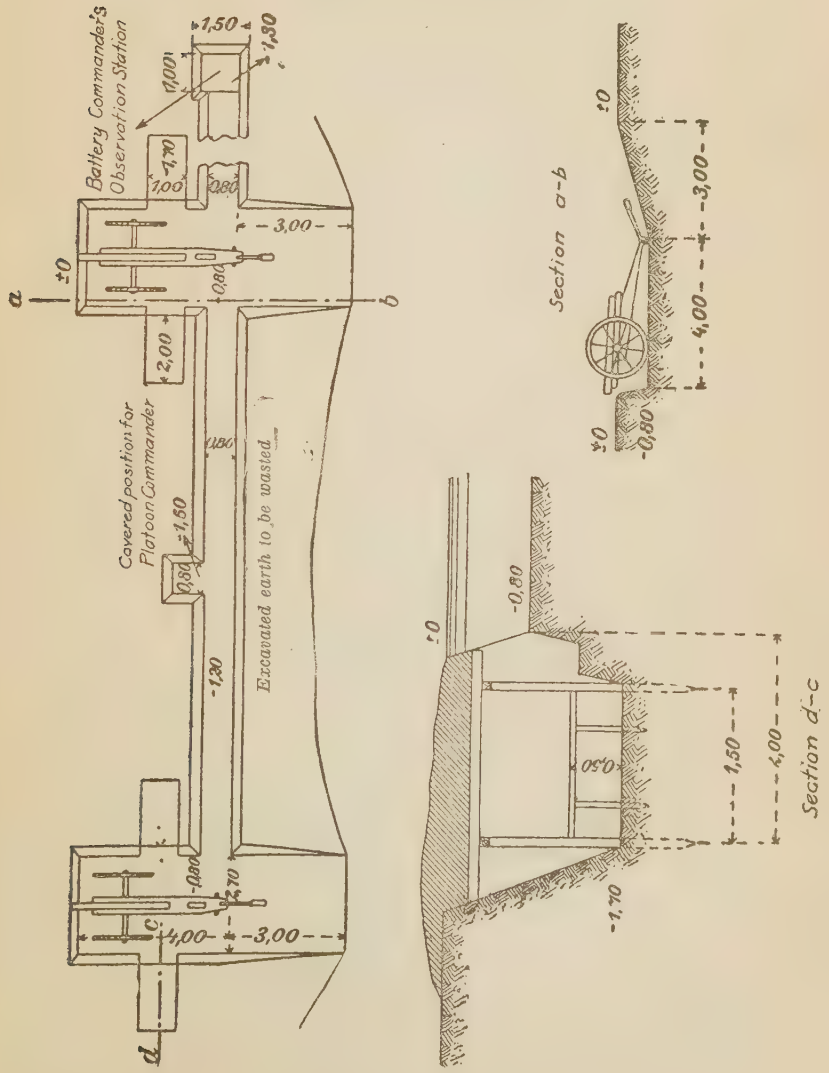



epaulements are unskillfully located, they frequently betray the position to the enemy, and are then more detrimental than useful. In order to make them less conspicuous, it is a good plan to connect them by a thin parapet and to

take precautions to prevent dust clouds visible at a great distance being raised at every shot. A breastwork may likewise be thrown up in front of the guns. By digging a con-

**Gun Pits.**

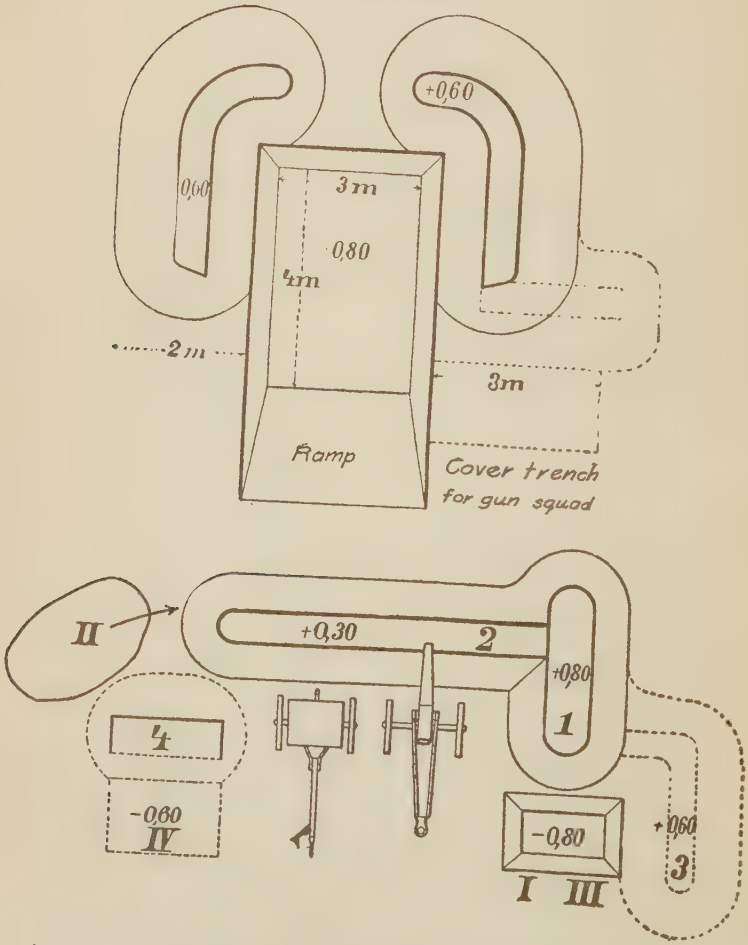
**(Time of construction: 5 hours).**



necting trench in rear of the connecting parapet, mentioned above, and by constructing splinter proofs and observation stations, the work may be further perfected in five hours.

**Austria.**

**Epaulements.**

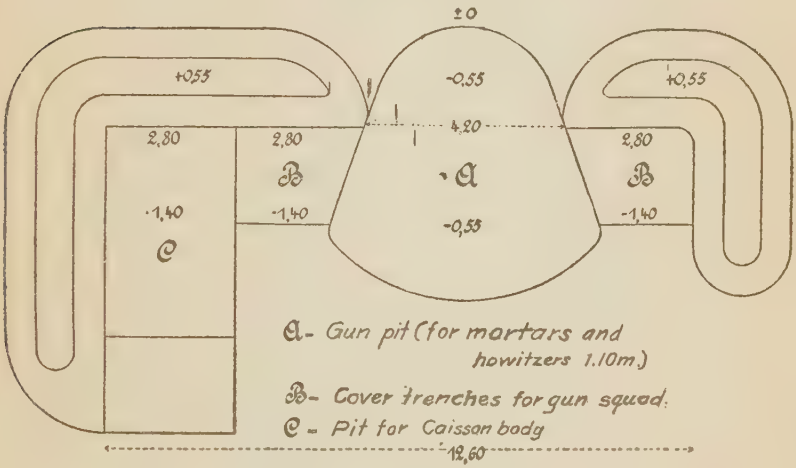



During prolonged spells of wet weather, water will accumulate in the ditches and trenches and proper drainage must be provided.

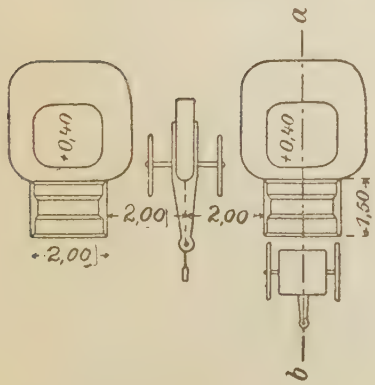
In providing cover for **light field howitzers** the first thing that should be attended to is the construction of trenches for the gun squads. These can be dug in forty minutes. The caisson body of each howitzer is posted in rear of the trenches provided for the personnel. A pit and epaulement for a light field howitzer can be constructed in about two hours.

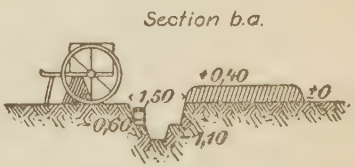
**Russia.**

**Gun Pit.**




**Cover for Light Field Howitzer.**

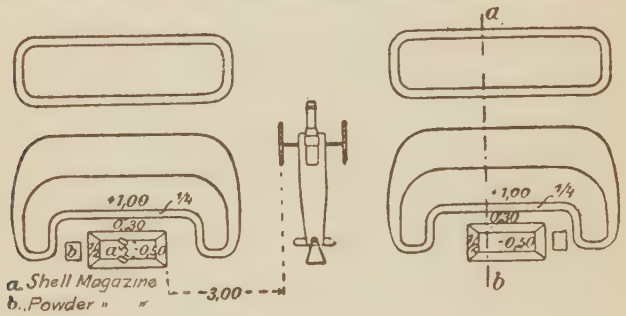


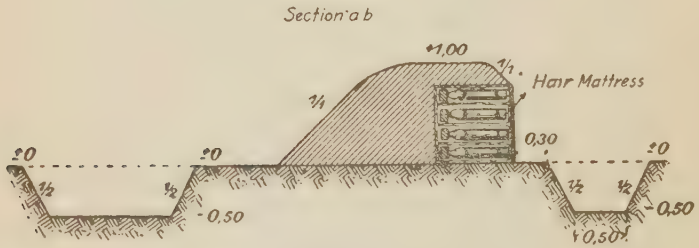



Cover for the heavy field howitzer is constructed similarly. "When not protected by shields, part of the men seek cover in the trenches on the flanks of the guns and the remainder in the magazines." (German Manual of Battery Intrenchments). Magazines should be provided for the ammunition, the projectiles and charges being stored separately.

**Cover for Heavy Field Howitzer.**

**(When time admits, an epaulement should be provided in front.)**




## 7. ARTILLERY COMBAT AT SHORT RANGES.

### (a) Artillery versus Infantry.

Purely frontal infantry fire is ineffective against artillery at mid ranges; some effect can be counted upon at very close ranges only. Even in the latter case, infantry can do no more than deprive artillery of its mobility and endanger its ammunition supply. "If artillery does not wish to move, infantry can never drive it off the field. On the contrary, if

the intensity of the fire increases, it can not move for the time being, because many of its horses will be shot. But that does not spell its ruin, by any means, for so long as a few men remain with each gun and load and train cooly, the battery continues to exist and to retain its full power until the last man at each gun is disabled."* The full significance of these words is just beginning to be appreciated. Artillery—in particular its observation stations—is most susceptible to the fire of scattered groups of concealed skirmishers that are plentifully supplied with ammunition, since it has no means of repelling them, unless some of its own infantry is pushed to the front.

**Examples illustrating the artillery combat at short ranges.**

1. After the capture of **Elsaszhausen** at the battle of **Wörth,**† Sylvius' Horse Battery engaged French infantry at a range of 600 m. and repelled a charge at a range of 80 m. with canister. During the assault on **Fröschweiler** Ohnesorge's Horse Battery advanced beyond the firing line of its own infantry and prepared the assault by firing on the edge of the village at a range of 600 m. While in this position, the battery repulsed unaided a cavalry charge. The battery had lost 94 horses, was absolutely immobile and unable to move into the bivouac assigned to it, though this was only 400 m. away, until fresh teams were brought up. The 5th Light Battery of the 11th Field Artillery unlimbered abreast of Ohnesorge's Battery, though a violent fire was directed upon it by French infantry and mitrailleuses.

Out of an effective strength of 4 officers, 150 men and 207 horses, each, Sylvius' Battery lost 1 officer, 7 men, and 33 horses, and Ohnesorge's Battery, 12 men, and 94 horses.

2. Stumpf's and Vosz' Batteries (IIId Army Corps) maintained their positions on the Roten Berg (battle of **Spicheren**) in face of French infantry lodged in trenches 700 m. away and supported by three batteries.‡

3. The 5th Heavy Battery of the 7th Field Artillery went into position on August 14th, 1870 (battle of **Colombey**) at the little wood of Colombey, within 700 m. of unshaken French infantry. In addition, the battery received a heavy shrapnel and mitrailleuse fire, was able to fire only twenty-eight rounds of shell in return in ten minutes and was then obliged to retire, leaving two of its guns temporarily on the ground. Its losses amounted to 5 officers, 3 non-commissioned officers and 11 men.¶

*HOHENLOHE, *Militärische Briefe*, III, p. 140.

†HOFFBAUER, *Deutsche Artillerie*, II, pp. 53 and 67.

‡*Gen. St. W.*, I, p. 35.

¶*Geschichte des 7 Feldartillerieregiments*, II, pp. 53 and 67.—KUNZ, *Kriegsgeschichtliche Beispiele*, 7, p. 10.

4. Artillery of the VIIth Army Corps at **St. Hubert** (battle of **Gravelotte**).*

5. During the opening engagements of the **South African war,** the English artillery was disposed to occupy positions at too great a range from the enemy, though in some instances, as at the **Tugela,** the nature of the terrain forced it to do so. On the other hand, it never hesitated a moment to advance closer to the enemy. Its losses were trifling. At **Modder River,** November 28th, 1899, it fired at a range of 1,600 m., at **Magersfontein,** finally, at 1,200 and 900 m. For the conduct of the English artillery at **Colenso,** see p. 311, *supra.*

If the enemy actually penetrates into the battery, the personnel continues the fight with its small arms. This is by no means hopeless. Although it will rarely be possible to drive the enemy out of the battery in this way, time will be gained until other troops can come up.

### (b) Artillery versus Cavalry.†

In order to enable them to repel a cavalry charge, it is essential that the batteries receive early notice, through timely reconnaissance, of the impending charge, to give them ample time to make all needful preparations to meet it. Whether artillery can repulse a charge, depends upon mutual coöperation of all of its elements, upon good fire discipline. If cavalry advancing frontally to the charge is observed at an early moment, it is a good plan to cease firing upon the old target, get a 400 m. bracket upon the cavalry with time fire and open volley fire, distributed evenly over the entire objective, at the short limit of the bracket. The sooner the charge is repulsed, the shorter the interruption of the activity of the artillery. The principal danger to the artillery does not lie in the first thin hostile line, but in the units following that line, and in hostile escadrons that may have been launched against its flank. It is a good plan

*KUNZ, *Kriegsgeschichtliche Beispiele*, 7, p. 23.

†See p. 209, *supra*. When repelling a cavalry charge, the English artillery sets fuzes at 500 yards and fires at will, thereby keeping a certain zone under fire between guns and cavalry. No effect is obtained at the longer ranges; under 500 yards, fuzes are set at zero. This procedure ensures a high rate of fire, but the rearward echelons—and these are the deciding factors in a charge—can approach almost unscathed.

to designate platoons or batteries to turn against such objectives. The fire should, therefore, be continued even after the leading hostile line has ridden through the battery. Even when the artillery receives timely notice of a flank attack, the task of repelling it is by no means easy, as a change of front can be executed but slowly, one piece at a time, after the trail spade of each has been pulled out of the ground. If engaged with hostile artillery at this time, the protection of the shields is dispensed with after such a change of front. In addition, the distances that have to be covered by the ammunition carriers increase as the caisson bodies can be moved but slowly, and a certain amount of excitement and nervousness among the personnel is unavoidable. A cavalry charge from the rear presents still more unfavorable features.

Cavalry will have scored a success, if it succeeds in temporarily silencing a long artillery line, or in dispersing the reserves and spreading disorder and panic. It is, at any rate, easier for cavalry to capture artillery than for artillery to ward off a well planned charge made by a large mass of cavalry.*

## 8. ARTILLERY SUPPORTS.†

Formerly the opinion prevailed that artillery should always be provided with a support, but our more recent regulations represent the view, based on lessons from the last campaigns, that artillery supports should only be provided when the artillery can not keep the foreground under effective fire, when its flanks are exposed to the attacks of enter-

*For examples from military history, see pp. 176 and 177, *supra*. Charge of French cavalry against artillery of the XIth Army Corps at Sedan. KUNZ, *Kriegsgeschichtliche Beispiele*, 5, p. 24, *et seq.* In spite of the violent canister fire that met them, hostile escadrons penetrated the 3d Heavy Battery of the 11th Field Artillery. The men of this battery defended themselves with sidearms and sponges until infantry arrived on the scene.

†Par. 371, *German F. A. D. R.*
*Journal des sciences militaires*, March and April numbers 1905.

prising cavalry, or when it appears isolated and unprotected by the other arms. Cases like the one last mentioned occur when artillery is taken out of the route column when still a long distance away from the enemy and pushed forward into action, "when necessary" in the combat of the cavalry division (pars. 524, German F. A. D. R.), in pursuit (pars. 521, German F. A. D. R.), and when a retreat is to be facilitated by fire from a flank position or, when in pursuit (pars. 516, German F. A. D. R.), "a pressure" is to be exerted on the hostile line of retreat. It is well worth considering whether cyclist detachments would not frequently suffice for this purpose. The fact that the Germans lost guns* in battle at Gravelotte, at Etrepagny, and at Beaune la Rolande only, undoubtedly influenced them somewhat in writing their regulations. The French and Russians, who had quite a contrary experience, lay far greater stress upon the necessity of artillery supports. Infantry and cavalry do not have the same value as artillery supports. Cavalry can reconnoiter to a great distance and can follow the movements of the guns without difficulty and is therefore able to protect them at the very moment when they are least capable of offering resistance, i. e., while on the march and while limbering and unlimbering. But cavalry does not possess the same power of resistance as infantry. On account of its more diversified combat activity, infantry is better able than cavalry to protect artillery effectively. This is due to the fact that infantry can fight on any terrain and against any arm of the enemy, whereas cavalry can only in the rarest cases afford protection against infantry approaching under cover. Hence, an artillery support that would meet all demands made upon it, should, strictly speaking, be composed of both arms. But this is impracticable, since an artillery

*During the Franco-German war, the German artillery lost six guns (KUNZ, *Kriegsgeschichtliche Beispiele*, 7, pp. 59–62), viz., 2 guns of the 4th Heavy Battery, 9th F. A., on August 18th, 1870, (*ibid.*, 6, p. 23), 2 Bavarian Reserve guns on the retreat to Coulmiers (*ibid.*, 5, pp. 70, 71), 1 gun of the 3d Heavy Battery, 10th F. A. at Beaune la Rolande (*ibid.*, 5, pp. 73 and 75), and 1 Saxon gun at Etrepagny on November 30th, 1870 (*Reiterei*, pp. 227–234).

support must not be made too strong, as it is withdrawn from participation in the actual engagement. Besides, the artillery supports will usually be furnished by the troops that happen to be in the vicinity. Batteries hurrying to the battlefield had best be supported by cavalry; later, during the action, this can be relieved, if necessary, by infantry. In defense, it is less a question of making extended movements than of repelling attacks on the artillery, and the artillery supports are taken from the infantry as a matter of course. In this case, reconnaissance is performed by the divisional cavalry and the scouts of the artillery. An artillery support should be made as small as possible. A support varying in strength from a platoon to a company of infantry or from a platoon to an escadron of cavalry, is sufficient, as a rule, for a single battery. During an advance, the cavalry hurries ahead, reconnoiters and protects the artillery against surprise, but must take care, in case of an encounter with the enemy, not to get between the latter and the battery, as this will prevent the guns from firing. During a retreat, the cavalry keeps in close contact with the enemy and endeavors to retard his pursuit.

In such circumstances, it is not easy for infantry to be on hand at the proper time. At Beaumont, Bavarian infantrymen were mounted on the caissons of the artillery.* To be sure, only a few men can be carried in this way and they can do little more than merely protect the guns against small bodies of cavalry, guard the unlimbering, and cover guns that are temporarily in a critical situation. But, since the cannoneers are now armed with the carbine, they can do as much. An artillery support composed of infantry follows the artillery as quickly as possible, and, above all else, endeavors to keep in touch with it. Infantry can best protect a firing battery by taking up a position in front or to the right or left front of it. The French split up their support, placing one-half on a flank of the battery for the latter's

*For additional examples, see p. 237, *supra*.

immediate protection and pushing the other half forward. This distribution has for its primary object the repulse of a cavalry charge directed against flank and rear. When hostile cavalry approaches, infantry should endeavor to prevent its getting to the guns by taking up a position in the vicinity of the battery. When engaged with hostile infantry, the artillery support should endeavor to select its position with a view to divert the hostile fire from the battery.

Cavalry acting as an artillery support had best be posted to the right or left rear of the guns, as it can then take any hostile attack in flank and is as much as possible withdrawn from the hostile fire. When infantry approaches to attack the battery, the important thing is to seize the proper moment for charging, to ride quickly and unexpectedly against its flank, preferably at the moment when the infantry moves to the charge, and, when necessary, to dismount some men to fight on foot. When advancing to the charge against hostile cavalry, care should be taken to prevent being thrown back upon the battery in case of defeat, as the guns will then be aunble to fire.

Former regulations prescribed that a mounted charge be made by the personnel of a horse battery for the purpose of covering the withdrawal of the battery against hostile cavalry. Such a charge was successfully made by the personnel of a horse battery at **Sellershausen** in 1806, and at **Leipzig** in 1813, to repel hostile skirmishers. At **Novlon Porcien,** September 3d, 1870, such a charge was made by the personnel of the 1st Horse Battery, 6th F. A.,* for the purpose of capturing prisoners. Such a handful of horsemen will scarcely be able to check a cavalry charge, and if the hostile troopers are so few in number that the forty-eight horse artillerymen could chase them away, a well aimed shrapnel would be much more effective. The danger that the enemy might enter the battery at the same time with the defeated cannoneers is, at any rate, greater than the chance of their success.

The other arms should feel in duty bound not to abandon their artillery. An order issued by Blücher on April 6th, 1813 to the Army of Silesia, deserves to be called to mind: It ran, in part, as follows: "When an engagement takes place, I demand that the troops of all arms of a brigade, as

*Gen. St. W., III, p. 12.

well as of any body of troops, regard each other as brothers in arms and do not abandon each other, and that they look upon their artillery as a sacred charge upon whose safety their honor depends. The commander of a body of troops, whether of infantry or of cavalry, who abandons a gun that happens to be in the vicinity, no matter whether it belongs to his unit or to another, unless he has sacrificed at least half of his men in its defense, shall be court-martialed."

Heavy field artillery does not require a support, as it has plenty of men that are not needed for serving the guns and are, in addition, armed with rifles.

In **France** and **Russia,** supporting escadrons are attached to the batteries of cavalry divisions.

**France:** Infantry is, as a general rule, posted on the flanks of a long artillery line, and also some 800—900 m. in front of gaps in that line to check the approach of hostile skirmishers. A company charged with this task will frequently be compelled to divide its men between front and flank of the line of guns.

**Russia:** The artillery support is to repel any attack on the guns. Its firing line is posted abreast of the batteries, its reserves in close order in rear of the batteries or in rear of their flank and close enough to be able to bring help promptly.

**Austria:** The commander of the artillery support (which is never smaller than half a company or half an escadron) is under the orders of the artillery commander if the latter is the senior in rank, otherwise arrangements for mutual coöperation are to be made. In addition, to the measures to be taken by the commander of the troops, the artillery is to provide for its own safety by making suitable provision for reconnaissance. Upon evacuating a position, the artillery support remains behind until the guns have the requisite start.

**Examples:** The batteries of the 6th Infantry Division, were supported by two escadrons, and the corps artillery of the Xth Army Corps by the 16th Dragoons, during the advance to the battlefield of **Vionville.***

At **Langensalza,** thirty Prussian infantrymen prevented Cambridge Dragoons from taking two guns that were stuck in the mud in a sunken road.†

At **Vionville,** an escadron of the 2d Dragoons of the Guard covered the withdrawal of Planitz' Horse Battery against three approaching French escadrons.‡

**Sapignies,** January 2d, 1871.¶

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*HOFFBAUER, *Deutsche Artillerie*, IV, pp. 24 and 58.

†LETTOW-VORBECK, *Feldzug von 1866*, I, p. 312.

‡KUNZ, *Reiterei*, p. 130.

¶*Ibid.*, p. 241.

At the battle of **Gravelotte,** the left flank of the corps artillery of the IXth Army Corps, at Vernéville, was without support.*

## 9. REINFORCING THE FIRING BATTERIES IN ACTION.

When reinforcements may be expected, sufficient room should be provided for the batteries that arrive late on the field, by appropriately curtailing the frontage and by closing in in each battalion, in order that an admixture of units may be avoided. On level ground, batteries that arrive late on the field should avoid going into position immediately beside or abreast of an objective upon which the enemy has already adjusted his fire. (Par. 424, German F. A. D. R.).† It may be advantageous to post the guns in echelon if it does not interfere with fire direction. To run guns up individually into an artillery line that is already engaged, interrupts the firing, considerably increases the density of the target offered and is only permissible in pursuit or when the enemy's fire is dying down. Artillery units should be maintained intact as long as possible or, at any rate, if broken up, reëstablished during a change of position. Battalions or batteries that go into action within the limits of a command other than their own, are subject to the orders of the officer commanding in that locality. The same is true of heavy batteries, which in similar circumstances are subject to the orders of the senior artillery officer commanding in the new position. (Par. 381, German H. A. D. R.). The brigade commander should regulate matters affecting command. It will sometimes be practicable to make room by moving batteries toward a flank,‡ but when this is impossible an attempt will have to

*Gen. St. W.*, II, p. 707.—HOFFBAUER, *Deutsche Artillerie*, V, p. 36.

†The Saxon 4th Light Battery reinforced the German batteries that were engaged with superior French artillery during the engagement at Villiers, November 30th, 1870. Only four of the guns were able to go into position at first, and in a short time casualties reduced the gun squads to one or two men per gun. In spite of this, the battery maintained its position. KRETSCHMER, *Geschichte der sächsischen Feldartillerie*, p. 170.

‡HOHENLOHE, *Militärische Briefe*, III, p. 196.

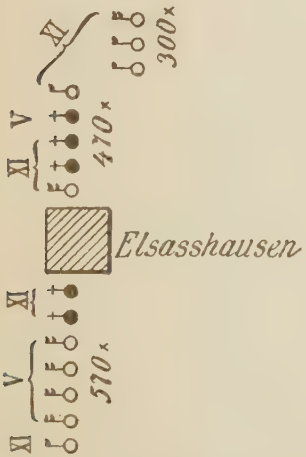
be made to close intervals between guns in each battery, (though even this is difficult), so that other guns may be posted in the intervals between batteries.

At **Wörth,** the four batteries of the 21st Infantry Division went into position at large intervals (total frontage, 600 paces), on the heights of Gunstett. As a consequence, some of the batteries that came up later had to move into these intervals, the heights not affording enough room, and two batetries found no room at all and were unable to go into action.

After the capture of **Elsaszhausen,** the admixture of batteries of the Vth and of the XIth Army Corps became still worse. (See sketch). The same thing occured in the very restricted position occupied by the XIth Army Corps on the heights of St. Menges (battle of **Sedan**).

At **Gravelotte,** some guns of the batteries of the IId Army Corps unlimbered in the intervals between batteries of the VIIth Army Corps, which were already engaged, but fired only from 1 to 15 rounds, so that difficulties in fire control did not become apparent.*

In the following figure, a circle with single flag denotes a battery of the 1st Division, a circle with a double flag a battery of the 2d Division, and a black circle with a cross a battery of the corps artillery, either of the Vth or of the XIth Army Corps:




**Position of the Artillery of the Vth and the XIth Corps at Elsaszhausen.**

**First Position of the Artillery of the XIth Corps.**

*HOFFBAUER, *Deutsche Artillerie*, V, p. 126.

## 10. CHANGES OF POSITION.*

Frequent changes of position interrupt the fire. To the time lost in moving from one position to another, must be added the time consumed in adjusting the fire in the new position. It is not advisable to change to a new position only a few hundred paces away from the old, as such a change does not appreciably influence the effect of the fire. And even if it does, such an increase is nullified by the cessation of the fire. The Austrians and Italians prohibit changes of less than 600 paces, the Russians, † changes of less than 600 m. In an attack, a change of position must bring about a material increase in effect, otherwise such a change had better not be made at all, unless there is danger that by remaining in the old position, touch with the advancing troops will be lost. A change of position is made by order of the commander of the troops; when necessary, his permission is obtained. When the tactical situation demands an immediate advance, or when it is a question of making the most of advantages gained, artillery must disregard this regulation. When it does so, the commander of the troops should be promptly notified. In Manchuria—the country being very open—the artillery usually did not attempt to change position in the day time, as, at the very outset, during the first engagements of the campaign, advancing batteries had been severely handled.‡ A change of position was either effected by piece or postponed until dark. In face of guns provided with shields, the difficulties attending a change of position are increased. At the battle of the Shaho, on October 12th, 1904, two Japanese field batteries advanced by successive

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*Pars. 464 and 465, *German F. A. D. R.*

What is stated here also applies to heavy artillery. It is desirable that the latter accomplish all its tasks from a single position.

†The first position is to be located from 2,000 to 3,000 m. from the objective, that for preparing the infantry attack, from 1,900 to 1,500 m. and that for supporting that attack, not less than 800 m. from the objective.

‡Russian batteries on the Yalu, at Wafangkou, and at Tashihchiao.

pieces, the latter following one another at 400 m., over an area swept by hostile shrapnel, and suffered no serious loss. Of the 26 carriages, 16 were fired upon, but in spite of this, the loss amounted only to 3 men and 17 horses. At Yangtsuling, four batteries of the 2d Japanese Division were in a very short time deprived of mobility when they attempted to move closer to the enemy. At the Yalu, a Russian battery that attempted to limber up, lost most of its horses in a few minutes.

When the hostile artillery is superior and its fire has been carefully adjusted, it may be a good plan to move the guns either forward or to the rear, in order to diminish the enemy's fire effect, to mislead him and possibly to compel him to readjust his fire. In Italy, guns are to be moved some ten or twelve meters in this manner, and in Russia, according to General Totleben, twenty to fifty meters.* It is unnecessary, of course, to obtain permission from the commander of the troops for such a trifling change of position. The same is true of a change of position effected by running the guns forward when defending a crest, in order to enable them better to sweep the forward slope. For short distances (about 50 m.), when the ground permits, the desired result will be attained much more quickly by running the guns forward by hand, opening fire as soon as two or three guns are in battery. The necessary ammunition can be taken along on the axle

*According to ROHNE, *Schieszlehre für die Artillerie*, p. 95, when firing on artillery in position, with time shrapnel, model '91, the following *hits per shrapnel* may be expected:

| Range m. | Intervals of Burst. 50 | 100 | 150 | 200 | 250 m. |
|---|---|---|---|---|---|
| 2,000 | 4.6 | 2.2 | 1.4 | 1 | 0.7 hits |
| 2,500 | 4.3 | 2. | 1.2 | 0.8 | 0.4 " |
| 3,000 | 4. | 1.7 | 0.9 | 0.55 | 0.25 " |
| 3,500 | 3.8 | 1.5 | 0.7 | 0.1 | —— " |

seats. It should be borne in mind that loaded limbers and caissons can be moved by hand by great exertions only. When considerable distance has to be traversed in a change of position and when the ground is soft, it is always better to bring up the teams. This will no doubt increase the losses, but the moral effect and the advantage of getting all the guns simultaneously into position should not be underestimated.

The commander of the artillery (battalion commander) turns over the command of the guns in the old position to the next senior officer, reconnoiters the new position, sends back his adjutant (or an orderly) with the order to move the batteries up, and meets the battery commanders, who hasten forward ahead of their batteries, with orders for moving into the new position. A battery usually moves intact into the new position (in Russia also by demi-battery), but exposed areas devoid of cover may be crossed by a piece or by a platoon at a time. Units larger than a battery will effect a change of position by echelons, those remaining in the old position meantime keeping down the enemy's fire. Since artillery that is in the act of limbering up or that is in motion presents a very good target, the defender's artillery, even if temporarily withdrawn, will seize this opportunity to come again into action. Guns must at any rate be kept in readiness to fire in order to prevent the enemy from firing without interference. It is of the utmost importance that artillery changing position limber up under cover, even if this entails running back the guns first, that it use covered avenues of approach, at least for the batteries that move first, that the whole movement be made rapidly, and that the fire be reopened promptly.

From the foregoing, it appears that when a change of position is contemplated, the following measures should be taken:

1. The new position and its approaches should be reconnoitered;

2. The reserves and the light ammunition column should be notified, the limbers should be refilled, unless this has already been done, and the manner of limbering up should be specified;

3. The batteries that are to move first should be indicated.

As many units should be kept back in the old position, as seem to be required in view of the intensity of the hostile fire. But, in any event, as many batteries should be sent forward to the new position as may be necessary to develop a strong enough fire power from the shorter range gained to facilitate the movement of the other batteries. Larger units (regiments) should change position by battalion. By doing this, time is gained and mixture of batteries is avoided.* When a change of position is made in order to support the infantry attack, haste is generally necessary; it will then no longer be possible to make the most of available cover and losses will have to be borne. As the critical stage of the action approaches, batteries will have to go into action regardless of losses.

The reserves and the light ammunition column follow the batteries as soon as the latter are in their new position, and take along any matériel that may have been left in the old position.

During a retrograde movement, the artillery commander as a rule rides ahead to reconnoiter the proposed position. The other artillery leaders as a rule remain with their commands (par. 398, German F. A. D. R.), but send experienced officers ahead to receive orders and to reconnoiter the position. (Par. 521, German F. A. D. R.). These officers may also be directed to clear the road that is to be used of trains and wagons. The reserves and ammunition columns are sent ahead beforehand. Artillery leaders do not ride ahead to reconnoiter until their commands are approaching the selected position.

The execution of a change of position will vary, depending upon whether the enemy has gained the superiority of fire or not. In the latter case, in order to keep the enemy at a distance, it is usually advisable to withdraw by echelons.

*While the artillery battalions of the Saxons were intact north of Ste. Marie-aux-Chênes, scarcely two batteries of any one battalion were together in the position south of Roncourt. The presence of light and heavy batteries of different degrees of mobility in one and the same organization, likewise contributed to the disintegration of units.

But when the enemy has gained the superiority of fire, it is almost invariably a mistake to withdraw by echelons, as this would enable the hostile artillery to turn all its fire on the batteries that have remained in position and prevent them from limbering. The guns should limber up successively, in order that the batteries may be enabled to take their places in the column without check or loss of time. The batteries that have been most exposed to the hostile fire begin to limber up first. To hasten the execution of the withdrawal, a separate route should be assigned, if practicable, to each battery. The movement is begun at the walk.

## 11. FIRE DIRECTION.

The effectiveness of artillery is measured by the effect produced on the target within a certain space of time by a mass of its projectiles. This effect will make itself felt proportionately sooner when the fire is opened unexpectedly, when it is concentrated, both as to time and space (fire surprise, par. 436, German F. A. D. R.), and when one succeeds in obtaining, even if only with part of the guns, a flanking effect. The employment of cross fire is then frequently a natural consequence. To obtain the maximum effect in the shortest possible time with the minimum expenditure of ammunition, is the guiding principle of modern artillery tactics. "Nothing but correct fire direction can harmonize the effect produced by the artillery with the intentions of the commander of the troops and with the actions of the other arms, especially with those of the infantry. Correct fire direction is the expression of tactical appreciation of the situation and of the purpose of the action. Correct fire direction is the certificate written with a hail of iron by the artillery commander as to the appropriate execution of the orders received and the intelligent appreciation of the intentions of the commander of the troops. Finally, it is com-

plete proof of soldierly ability to shoulder responsibility and of capacity for using initiative."*

The commander of the troops indicates in general terms the purpose of the action and the objectives. The artillery commander and the commanders of the higher artillery units assign objectives to elements of their commands and regulate the conduct and progress of the artillery action (fire direction). The conduct of fire is the function of battery and of platoon commanders. It is their duty to see that the orders given by the officers charged with fire direction are intelligently executed.

The Austrian regulations, after pointing out that artillery should always select the objective that is most dangerous to the principal arm, add: "One of the most difficult and, at the same time, most important duties of the artillery commander during an action, consists of deciding in all phases of the fight, whether to combat the hostile artillery, which is retarding our own infantry, or the hostile infantry, whose defeat it is, after all, that decides the action." One of the principal duties of the officers charged with fire direction consists in properly apportioning the work of heavy artillery and field artillery. Heavy artillery can best coöperate with field artillery by directing its fire against the target that is most dangerous for the time being, against the hostile field artillery, which fires as a rule from a masked position, and by keeping down the fire of the hostile field artillery, thereby releasing as many field batteries as possible to fight the hostile infantry. But it is essential that the positions of the hostile artillery be at least approximately known. To search a large area in which hostile artillery is believed to be located, leads to waste of ammunition. Field artillery should endeavor to combat these very effective howitzer batteries by firing shrapnel on them from a flank. Later in the action, the heavy artillery should prepare the assault by turning its fire on the point of attack and endeavor to de-

*Swiss Artillery and Engineer Journal, 1908, No. 1, p. 2.

molish supporting points and to annihilate infantry under overhead cover. (Par. 358, German H. A. D. R.). It is a waste of energy to put more batteries into action than are necessary to accomplish the object sought to be attained. In many cases, one can achieve the same result with a small number of guns firing rapidly as with a larger number of guns firing slowly. This is particularly true when repelling cavalry. (Par. 438, German F. A. D. R.).

Every opportunity to fire on the higher staffs and on observation stations (balloons) should be utilized.* Machine guns should, when practicable, be put out of action at ranges that are outside their effective zone, i. e., at ranges over 1,600 m. When opposed by deployed infantry, artillery should, as a rule, direct its fire first against the leading line, and turn any excess fire power that may be available against objectives in rear of that line. Infantry targets of considerable width should be combated section by section, so that no part of the target will for any length of time remain untouched by fire. Even inferior artillery should endeavor, by concentrating its fire, to obtain a superiority over at least a part of the objective. It is usually impossible to avoid distributing the fire among several targets, in order that some parts of the hostile force may not get into action unmolested. One should avoid dispersing the fire, for a numerical superiority in batteries becomes effective only through concentration of fire.

Batteries equipped with shields should be combated according to the same principles as objectives protected by artificial cover. One difficulty is that there are very few

*For this reason care should be exercised in posting headquarters' flags, which have also been adopted by other armies. They should be so posted that they will not draw the hostile fire on the staff. The death of General Douay at Weiszenburg and the wounding of Marshal MacMahon at Sedan exerted a marked effect upon the battles named. On September 1st, 1870, Marshal Leboeuf's staff was fired upon. KUNZ, *Noisseville*, p. 89. HOFFBAUER, VI, p. 105. The fire against headquarters' staffs is conducted as laid down in par. 196, *German F. A. F. R.*, which says: "Depending upon the degree of accuracy with which the range is known, the three platoons or the six guns, as the case may be, fire by platoon in the one case, or by volley in the other, with time shrapnel at ranges progressively increased by 100 m."

animate targets visible in a battery, that losses inflicted impair its firing but slightly, and that it is impossible in most cases to observe the target directly. Time shell of the light field howitzer and percussion shell (without delay action) of the heavy field howitzer, promise the best and quickest results. On the target range, good results have been obtained with guns using alternately time and percussion fire. This may likewise hold good in actual service. The use of shell against hostile guns presupposes accurate adjustment and requires that the flash of the hostile guns be clearly perceptible or that the guns be visible and that the range be not too great, i. e., not over 2,500 m. It will frequently be practicable to combat in this manner batteries provided with shields, when they advance to repel the infantry attack.

Lieutenant-General von REICHENAU and General LANGLOIS advocate the adoption of a small caliber gun to be used to dismount guns. But, among other things, the drawbacks inseparably connected with the introduction of a special type of gun, the low ballistic qualities of small caliber projectiles and the difficulties of ranging with them argue against its adoption. When the hostile guns are visible, they can just as well be dismounted by the fire of the field gun.

A battery should keep its sheaf of fire intact. It should, while developing the whole fire power of which it is capable, combat several targets only when it receives orders during the assault to prevent the silenced artillery of the defender from reopening fire. In a battalion, a change of target is ordinarily not made without orders from the battalion commander. When necessary, a battalion can switch all or a part of its fire to another section than the one assigned to it. Frequent changes of target impair the efficacy of the fire, as each change requires that the fire be again adjusted. A battery commander is justified in shifting the fire of his battery on his own initiative to another target when danger is imminent, or when important targets appear suddenly and remain visible for but a short time.

At **Wörth,** whenever the situation did not require a continuation of fire, the German artillery adjusted its fire on certain points west of the

village of Wörth and on the road exits at the Albrechtshouse farm, and was thereby enabled at once to take under fire French columns and a mitrailleuse battery that appeared at these points.*

### (a) ORDER OF FIRE OF FIELD ARTILLERY.†

The pieces are loaded in rotation immediately after being fired, when that method of loading is specified. A **salvo** (*Lage*) consists of a single discharge from each of the guns of a battery, fired n regular order from one flank to the other. When fire by salvo is used, as, for instance, in adjusting the height of burst, only one round is made ready.

**Continuous fire** (*Flügelfeuer*) begins, as a rule, from one flank or the other. The guns, beginning with the one on the flank indicated in the command, are fired in regular rotation at the command of the chiefs of platoon, the first gun firing again when the last one has fired. Each round must be observed. This regulates the rate of **ordinary fire** (4–6 rounds per minute). The rate of fire may be increased or diminished by the command "short" or "long" fire pauses. In **fire by piece,** the battery commander gives the commands for firing. It is therefore advisable to use this method of fire during adjustment so long as "errors in distribution require interference of the battery commander or when targets are to be kept continuously under fire without expenditure of a large amount of ammunition."

When a gun is not ready to fire, the chief of platoon at once directs his other gun to fire, or notifies the chief of platoon whose platoon is to are next. The delinquent gun does not fire until its turn comes around again. Whether the flank gun that fired first will be able to take up the fire when its turn comes again, seems doubtful, as there is neither smoke nor noticeable recoil to show when the last gun fires, and as the noise in a firing battery is deafening. The History of the 18th Field Artillery states: "It seemed as if we were right in the midst of a thunderstorm. Everyone, officers, non-commisioned officers and cannoneers, was deaf as a doorpost. It was necessary to yell to make oneself understood even at short range. Our ears rang for days after the fight and any penetrating noise caused them to ache."

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*HOFFBAUER, *Deutsche Artillerie*, II, pp. 46 and 122.

†Par. 133, *German F. A. D. R.*, and pars. 77–84, *German F. A. F. R.*

**Volley fire.** Each gun, without reference to the others, fires from one to three rounds, at the command of its chief. In many cases, this class of fire may facilitate observation and simplify judging of heights of burst. It makes it possible, moreover, in larger units, to distinguish the bursts of the various batteries. It is adapted for obtaining an effect quickly and for utilizing favorable moments in a rapidly changing situation. At the same time, it enables the battery commander, even when its rapidity is increased, to retain control. But, it may easily lead to a greater expenditure of ammunition than contemplated and should, therefore, be used for short periods only. Continuous and volley fire will be used alternately, as a rule, in fire for effect.

**Rapid fire** (maximum about 25 rounds per minute), enables a battery to develop its maximum fire power, but makes fire control difficult and entails a large expenditure of ammunition. It should, therefore, be used only in case of imminent danger and when severe losses in personnel and matériel have impaired the normal action of a battery. When rapid fire (either time or percussion) is used during calm or damp weather, such a dense smoke-cloud will be formed in front of the target that if the latter is low, it will be scarcely visible. If then the fire is directed at the lower edge of this smoke-cloud, the shots will fall short, and if the target is low and percussion fire is used, the results will be insignificant on account of the limited radius of effect. Pauses in the fire are, therefore, necessary to let the smoke dissipate. The French contemplate blinding the enemy in this manner by smoke, dust, and fragments.

**Fire by battery** (*Salve**) is employed in adjustment, either concentrated or distributed to facilitate observation—for example, when several batteries have the same target, when conditions for observation are unfavorable, and when the smoke ball of a single projectile can not be seen with

*Simultaneous discharge of all the guns. The term "fire by battery" was selected for want of a better term.—*Translator.*

sufficient clearness;* and in fire for effect to produce a great simultaneous effect on the target,† since the effect is increased when a number of projectiles strike the target simultaneously. When fire by battery is used against animate targets, it is distributed. The battery commander gives the commands for firing. After firing one round (time fire), the pieces are reloaded at the command of the battery commander. The long pauses between successive discharges by battery are a drawback, but the great effect produced in a short time and the facility of observing the fire are an advantage.‡

### (b) ORDER OF FIRE OF HEAVY ARTILLERY.¶

**Fire by piece** is used in the adjustment and when the battery commander desires to keep the fire under control, for example in firing on moving targets and to take advantage of good conditions of light and observation.

**Ordinary fire** may begin as soon as a bracket has been obtained. It should be ordered not later than the moment of passing to fire for effect. **Rapid fire** should be used for very brief periods only, as it unduly taxes strength and accuracy of the cannoneers. **Fire by battery** (*Salve*) may be employed in adjustment when the conditions for observation are unfavorable and to avoid mistaking the bursts of other batteries for those of one's own battery; to verify whether the guns are properly laid on the target announced when firing in larger units; and to take advantage of favorable moments that occur during the action. In a critical

**Beobachtungssalven*, literally, observation salvos. The term salvo here means simultaneous discharge of all the guns of the battery (platoon).—*Translator.*

†*Wirkungssalven.*

‡SKOBELEV'S orders to his artillery during the battle of Lovtcha state: "As soon as our troops advance to assault the Ryschaja Gora, fire by battery should be employed as long as possible, until the forward movement of our troops necessitates a cessation of fire." KUROPATKIN, I, p. 59.

Fire by battery was used as a signal for making a simultaneous attack at Gorni Dubniac. PUSYREVSKI, *Russische Garde*, p. 125. The attack was to be made at the ninth discharge. The scheme failed. Fire by battery was likewise used as a signal to widely separated advancing troops. KUNZ, *Orléans*, p. 217.

¶Pars. 148–151, *German H. A. F. R.*

situation, the battery commander is able to keep better control by employing fire by battery. The drawback of this class of fire lies in the unavoidable pause between successive discharges and in the fact that it is impossible quickly to correct an error in direction in any one gun. The last mentioned disadvantage may be obviated by using a rapid salvo (the so-called *Rollsalve*), in which the guns are fired rapidly in rotation.

### (c) RATE OF FIRE.

The rate of fire of a single gun depends upon the time consumed by the piece in returning into battery after a shot is fired, and upon that consumed in setting the fuze of the next shrapnel. When several guns are considered, the rate of fire during adjustment (adjustment of height of burst) is governed by the necessity of observing each burst (field gun model '96: time of flight of projectile at 1,500 m., 4 seconds, at 3,000 m., 9 seconds) and of making the requisite corrections.

The expenditure of ammunition and the rate of fire depend upon the object of the action and upon the importance of the target. A dangerous target, as well as a favorable one, and the necessity of utilizing fleeting moments increase the rate of fire. But accuracy of laying and of setting fuzes should, in no circumstances, be impaired by even the most rapidly delivered fire. Timely change from slow fire to accelerated fire interrupted by pauses, must form the rule and will be best calculated to avert waste of ammunition. The effect produced by the fire in actual war will be the best guide. The great effect produced by time shrapnel makes it unnecessary, as a rule, to increase the rate of fire for any length of time. When practicable, longer pauses are made. When an effect is to be produced suddenly at the critical moment, and to take advantage of rapidly passing opportunities, these pauses should be shortened as much as the reliable service of the guns permits.

### (d) CONDUCT OF FIRE.*

In firing, it is less important to obtain the maximum effect, a matter that would entail painfully accurate adjustment and much time, than to obtain a sufficient effect in the shortest possible time. One should endeavor to obtain this effect not so much by saving ammunition, as by saving time. The better the conduct of fire, the sooner will an effect be produced.

**Fire for effect** is preceded by **fire for adjustment.**† The latter has for its object the prompt determination of the data required for fire for effect, namely the range, the corrector and the proper distribution. In France, Russia, and Austria, time fire is used in adjustment, the fire being distributed over the whole target. Adjustment by percussion fire does, indeed, enable the batteries to go into position with loaded guns, and this is an advantage, but observation of the quickly rising, dirty-white cloud of burst depends to a great extent upon the terrain. At any rate, adjustment by time fire is quicker, as no bursts are lost, as it is easier to observe the snow-white ball of smoke, which descends immediately upon becoming visible, and as the very first round is frequently effective. In Germany, the 100 m. bracket is obtained by firing, frequently with one piece only, at two limiting distances (one short, the other over). This is followed by time fire, beginning at the inferior limit of the bracket. To obtain a 100 m. bracket when adjusting by time fire, the two guns of a platoon fire in rapid succession with the same elevation and corrector. With low points of burst, this method of adjusting presented no difficulties.

The French obtain a 200 m. bracket by firing salvos of four shots with the same elevation and corrector. A verifying salvo is then fired at the inferior limit of the bracket.

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*ROSKOTEN, *Die heutige Feldartillerie*, I, p. 209, *et seq.* Captain H. SCHREINER, Austrian Artillery, *Über die Schieszregeln der Feldartillerie der kontinentalen Groszmächte. Mitteilungen über Gegenstände des Artillerie und Geniewesens*, 1909, VI, p. 405.

†In Russia and Germany against immobile and mobile targets, in France, Austria and Italy, against troops and immobile targets.

It is easier to get the gunners in the target when using a single gun; but firing several shots certainly facilitates observation, and the somewhat greater expenditure of ammunition is negligible. If in percussion shell fire, one desires to obtain a 50 m. bracket, one must reckon with the fact that errors in observation multiply.*

## (e) THE USE OF THE VARIOUS PROJECTILES.

(See p. 223, *supra, et seq.*)

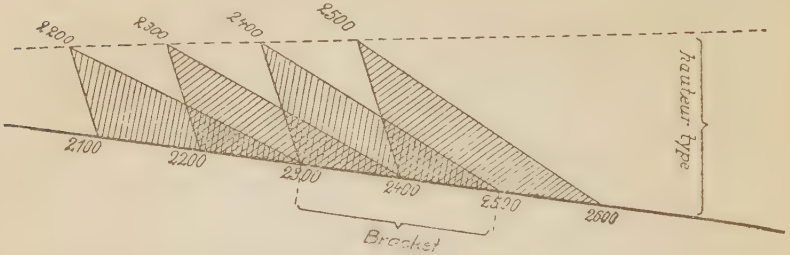
### Provisions of Various Regulations.

**France:** The *salvo*, *rafale fire*, and *fire at will* (*à volonté*) are used. The latter is employed against targets that suddenly appear at ranges under 500 m., and is discontinued as soon as the desired effect is obtained. The salvo corresponds to the German salvo (*Lage*), which begins with a flank gun. In the salvo, all the pieces have the same elevation and are fired in turn from the flank indicated in the command, the intervals between the shots being about 2 or 3 seconds. The *rafale* consists of a series of shots, usually 2 or 3, fired rapidly by each gun independently of the others, all guns using the same elevation. Salvos, either time or percussion, are used in fire for adjustment (*tir de réglage*). The methods of fire for effect (*tir d'efficacité*) are:

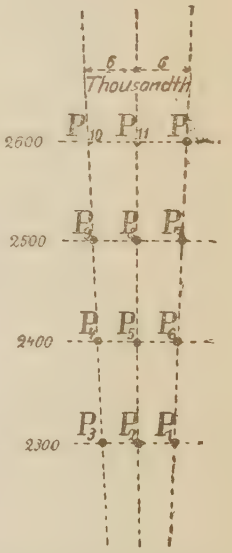
*As Lieutenant-General ROHNE points out (in *Artillerieschieszspiel*, and in the article *Über die Zuverlässigkeit des Einschieszens*, in *Archiv für die Artillerie und Ingenieuroffiziere*, 1897), the difficulties in adjustment increase as the length of the bracket decreases, being greatest when it is desired to determine the range accurately to within 25 m. "This may be explained by the fact that the closer the bursts are to the target, the more difficult it is to decide whether they are short or over. Besides, the trajectories of two projectiles fired at ranges differing by only 50 or 25 m., may frequently overlap, due to dispersion, thus leading to incorrect determination of range in spite of accurate observation."

Under the assumption that one-tenth of all observations are in error when the mean dispersion in depth is 50 m., Lieutenant-General ROHNE computes that of one hundred 200 m. brackets obtained by two shots percussion fire, only about

1. Progressive fire (*tir progressif*);
2. Progressive fire with sweeping (*tir progressif avec fauchage*); and
3. Fire at a single range (*le tir sur hausse unique*).




1. **Progressive fire.** This begins after a 200 m. bracket has been obtained.* By means of this fire, it is intended to beat a broad and deep zone in rapid fire, two shots being fired by piece at four elevations, differing by 100 m., and beginning at one smaller by 100 m. than the inferior limit of the bracket. For example: Suppose that the target is located within a bracket whose limits are 2,100 and 2,300 m. After this has been obtained, each piece fires two shots, fire at will, at 2,000, at 2,100, at 2,200, and at 2,300 m. At 3,000 m., the beaten zone of a shrapnel is 150—180 m. deep, so that when employing progressive fire (without sweeping), a battery can cover with its fire an area 100 m. wide and 550 m. deep.




In progressive fire, two shrapnel fragments or bullets per minute fall within the space that is taken up by the German company column (*Kompagniekolonne*) which has a width of 12 m. and a depth of 17 m. This, of course, gives nothing but an approximate idea of the density of the hail of

seventy-one are correct, in other words, that more than a fourth of the total number are false. Out of one hundred 100 m. brackets, each obtained by three rounds, only about fifty-two are correct, hence about half of the total number are false. According to General SABUDSKI, Russian Army—*Die Wahrscheinlichkeitsrechnung und ihre Anwendung * * * auf die Theorie des Einschieszens*, translated by Lieutenant Ritter von EBERHARDT—from 10.1 % to 30.7 % out of 12,000 rounds fired at the Russian Artillery School of Fire, were observed incorrectly.

Military history furnishes many instances of failure to adjust fire correctly. The 3d and 4th Batteries 5th Field Artillery, fired at the same target, the former with an elevation of 1,500 m., the latter with one of 2,250 m. Neither battery hit anything. The correct range was 2,000.

*Regressive fire (*tir regressif*) begins with the longer limit of the bracket and continues until the battery commander observes bursts in front of the target. In this method of fire, he can do this much more readily than if he begins firing at a range that will give bursts short of the target, as the smoke-clouds of these will then obscure those of the succeeding shots. Regressive fire makes it easy for the battery commander to eliminate ineffective ranges.

fragments. When the fire is actually directed upon a company, the latter's losses soon increase until they become annihilating. In his *Instruction méthodique* (p. 78), S. LAITHEZ assumes that a battery will fire forty-eight rounds in forty seconds. This would mean one fragment to every area 1 m. wide and 6 m. deep. According to official figures,* progressive fire (32 rounds) directed against a front of 100 m., at the targets named, will produce the following losses per 100 men:

| 1. Infantry standing in single rank. | 2. Infantry lying down in single rank. | | |
|---|---|---|---|
| | without knapsack | with knapsacks carried on backs of the men | knapsacks used as head-cover. |
| At | At | | |
| 2,000 m. 45 | 2,000 m. 19 | 15 | 6 |
| 3,000 " 33 | 3,000 " 16 | 8 | 11 |
| 4,000 " 21 | 4,000 " 13 | — | — |
| 5,000 " 14 | | | |

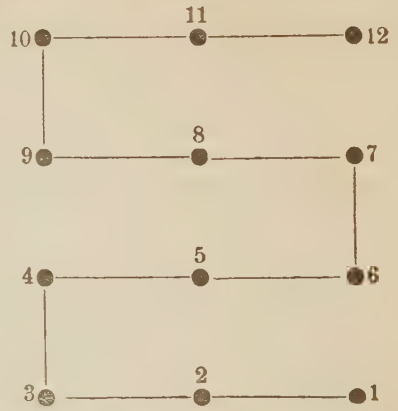
3. ARTILLERY.

| At | without shields | with shields of French pattern. |
|---|---|---|
| 2,000 m. | 33 | 20 |
| 3,000 " | 28 | 15 |
| 4,000 " | 20 | 11 |

When the cannoneers take shelter behind the shields, the above losses are reduced three percent. Accounts of the campaign in Morocco state that of all men struck by shrapnel bullets or fragments at ranges under 2,500 m., 10% were killed outright, 20% very seriously, and 70% slightly wounded; that the latter were able to leave the field without assistance and that they recovered rapidly.

*TREGUIER, *Cours elementaire de tir en campagne*, Paris, 1908.

2. **Progressive fire with sweeping** (*tir progressif avec fauchage*). This is used when a target of considerable breadth is to be attacked. In this method of fire, each piece fires three rounds at each of four ranges. After each round fired at the first range, each piece is traversed to the left by three turns of the hand-wheel, i. e., its direction is changed by $\frac{8}{1000}$ of the range. This procedure is then repeated at the other three ranges, except that at the second each piece is traversed to the right, at the third to the left, and at the fourth back to the right.

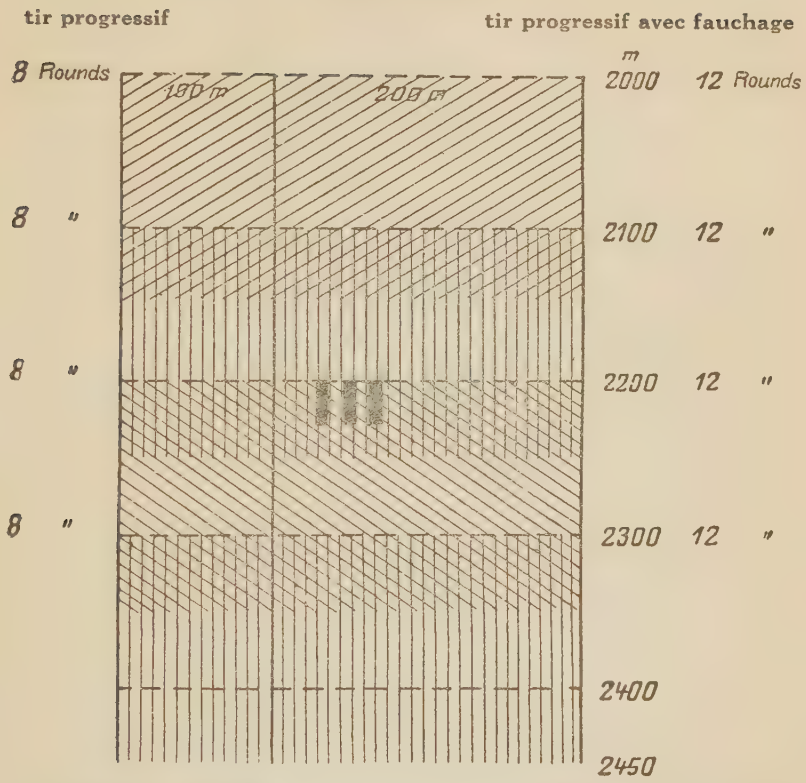



3. **Fire at a single range** (*le tir sur hausse unique*). This is employed when an accurate adjustment has been secured. This fire produces the necessary effect with the minimum expenditure of ammunition. It is used chiefly for demolishing obstacles and matériel and for annihilating a specially dangerous or stubborn enemy, whether this be to prevent a partially defeated enemy from moving, or a moving target from crossing a particular zone. The French progressive fire takes errors of adjustment into account and brings out the characteristic properties of rapid fire guns most clearly. At a single command, the storm of fire starts automatically. After 32 or 48 rounds, as the case may be, a pause occurs in the fire. It is impossible to adjust the height of burst, and it is difficult to distinguish one shot from another at the various ranges. On the other hand, a whole area is swept, and an effect produced that, while not the maximum attainable, is sufficient. The moral effect is tremendous, as a rafale without sweeping lasts two minutes only, and with sweeping three minutes only. The effect should not be judged by the hits on any one target, for, in spite of the latter's distribution in depth, the whole body of troops constituting the target is, as a matter of fact, swept by the fire.

In contrast to the French progressive fire, the German volley is fired at one elevation only. This facilitates observation and determination of the intervals of burst, but requires accurate adjustment. The German method of fire is characterized by the endeavor to obtain maximum effect with minimum expenditure of ammiuntion.

**Holland:** The firing regulations combine the German and the French methods of fire, taking from the former the volley (*Gruppenfeuer*) and from the latter the progressive fire with sweeping (*tir progressif avec fauchage*). In sweeping fire, each piece fires three rounds at a single range. The first round is fired with the line of sight normal; before firing the second, each piece is traversed to the right by a full turn of the hand-wheel, and before firing the third, it is traversed by two full turns to the

**Fire for Effect.**




| | | | |
|---|---|---|---|
| In 2 minutes: | 32x300. | In 3 minutes: | 48x300. |
| | Fragments and bullets= | | |
| In 2 minutes: | 9,600. | In 3 minutes: | 14,400. |
| In 1 minute: | 4,800. | In 1 minute: | 4,800. |

left. In sweeping a broad zone, five rounds are fired by each piece. The first round is fired directly to the front; before firing each of the two succeeding rounds, each piece is traversed to the right by one full turn of the handwheel; before firing the fourth round, each piece is traversed to the left by four full turns of the handwheel; before firing the fifth round, each piece is then traversed to the right by one full turn of the handwheel. Another full turn of the handwheel will then bring each piece back to the original direction.

**Austria-Hungary:** General principles: "1. An effect, even if but moderate at first, should be obtained quickly for the purpose of gaining the superiority of fire, and this effect should be promptly augmented by correcting the firing data during the fire for effect. When the situation

demands it, fire for effect may be begun with firing data that are only approximately correct.

"2. The method of fire used should be that best adapted to the circumstances of the case. To this end, the fire should, as a rule, be controlled directly by the battery commander. When necessary (fire surprise) in firing on targets that are visible for brief periods only, gunners should independently make the necessary corrections.

"3. Each element of the battery may be assigned a separate section of the target, which it must keep under fire."

A first lieutenant assists the battery commander in conducting fire.

Methods of fire:

1. **Salvo** (*Lage*). In this, the pieces fire one round each in regular rotation from one flank of the battery to the other.

2. **Progressive fire** (*Streuen*): Each piece fires shrapnel at ranges differing from each other by 100 m., a zone about 400 m. deep being swept. Chiefs of section give the commands for firing. This method of fire corresponds to the French *tir progressif*.

3. **Volley fire** (*Einzelfeuer*): This corresponds to the German "volley fire" (*Gruppenfeuer*).

4. **Fire by battery** (*Salve*): In this, all the guns of the battery are simultaneously discharged. It corresponds to the German "fire by battery" (*Salve*), and to the "salvo" of the U. S. A. D. R. of 1891.

5. **"Ausfeuern,"** corresponds to the German "*Rohre frei*," and to the "Loaded guns, Rapid fire" of the U. S. A. D. R. of 1891.

6. **Fire by piece** (*Batteriefeuer*): This corresponds to the German "fire by piece" (*Einzelfeuer*), and to the "fire by piece" of the U. S. A. D. R. of 1891.

7. **Ordinary fire** (*Geschützführerfeuer*), corresponds to the German "ordinary fire" (*gewöhnlichen Feuer*), except that commands are given and corrections are made by chiefs of section as in France, whereas this is done by platoon commanders in Germany.

"During adjustment, the fire is usually distributed from the very start over the whole target, so that each gun covers a front about 20 m. wide. The adjustment is usually effected by firing platoon salvos (2 rounds), but in certain circumstances, battery salvos may be used for this purpose. The same kind of fire (time or percussion) that is to be used in fire for effect is generally used in fire for adjustment. In adjusting by time fire (and this is the rule when the fire is directed against troops), low points of burst should be used. A long bracket—200 or 400 m.— is first sought, and then reduced to 100 m.

"The adjustment may be expedited by letting the elements of the battery fire at different elevations. This is called "progressive adjustment" (*skaliertes Einschieszen*). It should be used when the range has been measured, when previous firing on another target furnishes data in regard to the range, or, finally, when it is desired to obtain quickly data for fire for effect at long ranges on targets that are distributed in depth or

moving. In this class of fire, the platoons of the battery fire at ranges differing from each other by from 100 to 400 m."*

The methods of fire for effect are:

1. **Salvos** (*Lagen*);
2. **Progressive fire** (*Streuen*)—in case of guns;
3. **Ordinary fire** (*Geschützführerfeuer*)—in case of howitzers;
4. **Short range fire** (*Nahfeuer*).

In firing salvos, it is permissible to make corrections of 50 or 100 m. until effective salvos are obtained. The elevations may also be changed from time to time. Against moving targets, the fire begins with the limit of the bracket toward which the target is moving, or, if this is not apparent, with the mean of the bracket.

Progressive fire is generally used against moving targets. A 200 m. bracket is first sought. Each gun then fires one round at each of four ranges, differing by 100 m. and beginning with one smaller by 100 m. than the inferior limit of the bracket. The Firing Manual prescribes still another method, regressive fire (*ins Kurze streuen*), in which each gun fires one round at each of four elevations, beginning with the long limit of the bracket.

In close range fighting, shrapnel set to burst 275 m. in front of the muzzle is used at ranges from 300 to 500 m. At closer ranges than these, shrapnel with fuzes set at zero are used.†

**Italy** (Provisional Regulations): Projectiles are used as in Germany. Kinds of fire: Fire by platoon and fire by battery (i. e., simultaneous discharge of all the pieces of the platoon or battery, as the case may be); fire by piece; progressive fire. Fire at a single range, either by platoon or by battery (simultaneous discharge of all the pieces). Fire by platoon at several ranges may be used in bracketing the target. Fire by piece may be used in fire for adjustment. Progressive fire is of two kinds: In the first, each piece fires one round (time fuze) at each of four ranges differing by 50 m., beginning with the shortest range of the four; the second (called *per serie radoppiate*), is like the first, except that each piece fires two rounds at each of the four ranges. In general, a 200 m. bracket is considered sufficient for time fire, and one of 100 m. for percussion (shell) fire.

**Russia** (Provisional Regulations): The methods of fire may be divided into two general classes, viz., salvos and volley fire. Salvos are fired by battery, by demi-battery, or by platoon. In any salvo, the pieces are fired in regular order from one flank of the battery (demi-battery or platoon) to the other and back again. There is one exception; the battery salvo may also begin with some specially designated piece other than one on a flank. The battery may pass from demi-battery or platoon salvos

**Artilleristische Monatschefte*, 1909, p. 372, *et seq.*

†*Die Feuertätigkeit der 8 cm. Feldkanonenbatterien.* A study for artillery officers. Karl EISNER, Lieutenant-Colonel Austrian Army. 2d Ed. (with two plates) Vienna, 1909.

to battery salvos, and from platoon salvos to demi-battery or battery salvos and vice versa. Continuous fire may be accelerated or retarded by specifying what the interval between consecutive shots is to be. When this interval has not been indicated, shots follow each other at from two to three seconds. This still allows the burst of each to be observed.

Volley fire is delivered at the maximum rate. Each piece is fired as soon as it is ready, the number of rounds to be fired being specified, except in imminent danger, for the immediate defense of the guns, when the number to be fired is not announced and fuzes are set at zero.

Adjustment by time fire is the rule at ranges over 2,000 m., a 200 m. bracket being sought. Progressive fire is used for effect, the ranges used in this, differing by 120 m. Series differing regularly by the same amount are not to be used, in order that the enemy may not recognize the kind of fire employed.

In firing on advancing troops, after the bracket has been obtained, the elevation and corrector are reduced three or more sight divisions (120 m. or more); but, in certain circumstances, the target may be allowed to run into the fire.

**England:** The adjustment of fire is effected by one platoon (in exceptional cases by a single piece), the two pieces of which simultaneously fire one round (time fuze) each at elevations differing by 300 yards (270 m.). During the firing, the bracket may be narrowed to 100 m. Progressive fire: In this, each piece fires three rounds at each of three ranges differing by 100 m., the initial range, which is the shortest of the three, being announced in the command. This procedure may be repeated several times. Progressive fire with sweeping is executed like progressive fire without sweeping, except that the direction of each piece is changed by two degrees after each round.

## 12. EXPENDITURE OF AMMUNITION.*

"Ammunition is the life of artillery. One of the principal duties of a commander of troops (commander of ammunition columns and commander of artillery groups) consists of disposing the ammunition columns (and ammunition depôts) during the advance as well as during the action in such a manner as to secure to each artillery battalion as much ammunition as the fulfillment of its task will, in all probability, require.

"Such a disposition of the ammunition columns is, in addition, the best means of shifting the center of gravity of the artillery combat—without protracted and frequently

*Supplement to *Militär-Wochenblatt 1872.*

impracticable displacements of entire bodies of artillery—to the areas that, in view of the tactical situation, are recognized as the decisive ones.

"It is the duty of all artillery commanders to make both ends meet, and to see that ammunition is replenished without loss of time and without causing complaint from the ammunition columns." (Provisional Austrian A. D. R.).

At **Gross-Görschen** the Prussian artillery (136 guns) fired an average of 61 rounds per gun, at **Ligny** (192 guns) 47, and at **Königgrätz** (672 guns), 69 rounds per gun.

At **Solferino,** the Austrian artillery (368 guns) fired an average of 29 rounds per gun, and at **Königgrätz** (672 guns) 29 rounds per gun.

During the **Franco-German war,** the German batteries named had the following ammunition available:

| | With the battery. | | With the battery and amm. columns. | |
|---|---|---|---|---|
| | Total. | Per gun. | Total. | Per gun. |
| Light battery | 942 | 157 | 2,100 | 350 |
| Heavy battery | 798 | 133 | 1,710 | 285 |

The average number of rounds expended per gun was as follows: **Vionville** 94, **Coulmiers** 67.6, **Gravelotte** 56.5, **Sedan** 55.8, and **Wörth** 42.6 rounds.

At **Vionville,** the batteries of the IIId Army Corps expended the following ammunition: Two batteries 825 rounds each, two batteries 1,040 rounds each, and the others 1,164, 1,148, 925, 844, 735, 584, 562, 552, 470, and 432 rounds, respectively. The batteries of the Xth Army Corps, expended 1,048, 785, 677, 603, 597, 475, 444, 332, 259, 255, 248, 175, 157, and 141 rounds, respectively. The batteries of the IVth, the IXth, and the VIIIth Army Corps that participated, expended 585, 400, 289, 211, 65, and 38 rounds, respectively. There were in all 37 German batteries engaged at Vionville, and they expended a total of 19,650 rounds of ammunition.

The two artillery ammunition columns of the IIId Army Corps were the only ones at hand. The Ist ammunition echelon of the Xth Army Corps, comprising two ammunition columns, was delayed by other troops on its march and did not arrive until the morning after the battle. Ammunition frequently ran short therefore, as all the batteries had to replenish their supply from the two ammunition columns of the IIId Army Corps. The severe losses among the personnel and teams made it impos-

sible for the batteries to send back their reserves to replenish the supply, and the caissons of the ammunition columns had to be sent, one after another, to the batteries, to be emptied there. Under these circumstances, losses were unadvoidable.

At **Vionville,** August 16th, 1870, of the artillery of the IIId Army corps,

| | |
|---|---|
| One light and one heavy battery expended over 700 rounds each; | An average of 139 rounds per gun. |
| One light and two heavy batteries expended over 800 rounds each; | |
| Five light batteries and one heavy battery expended over 900 rounds each. | |

At **Gravelotte,** August, 18th, 1870, the average number of rounds expended per gun was as follows: In the Guard Corps 94, in the IIId Army Corps 46, in the VIIIth Army Corps 65, and in the IXth Army Corps 50 rounds.

At **Magersfontein** (1899), four English batteries expended 164, 167, 168, and 208 rounds of ammunition, respectively, per gun.

**Russo-Japanese war.*** "The large expenditure of ammunition is due to the fact that existing conditions, which diminish or make it difficult to obtain an effect, frequently compel artillery to fire though it knows that a part of its projectiles will not produce an effect. To this category belong fire by battery (simultaneous discharge of all the guns) to facilitate observation, and searching fire, which must be used in attacking targets that are both wide and deep, and also against targets located in areas that can not be observed or whose position can not be accurately determined because they are not plainly visible, i. e., masked.

"In the Russo-Japanese war, it appeared clearly how the tactical demand for artillery effect in circumstances that made it technically difficult to obtain, led to a great expenditure of ammunition. The principal factor in this was the endeavor to silence the hostile artillery. The Japanese batteries often ceased firing when they were severely bombarded. But very soon they opened up again, and thereby forced the Russian batteries to double the intensity of their fire in order to silence them. As is well known, batteries were put entirely out of action in exceptional cases only, and so the game went on merrily for whole days, cost a large amount of ammunition, and produced but trifling results.

"The meagre results produced by the ammunition expended by the Japanese artillery when preparing the infantry attack on prepared positions, is just as astonishing. So long as the advance of the Japanese infantry did not force the Russian infantry to fire, it sought cover in its trenches and suffered practically no losses at all.

"During the nine days fighting at **Liaoyang,** an artillery brigade expended a total of 15,933 rounds of ammunition. The mobile amount of ammunition available within a corps amounted to 17,644 rounds. Hence, a period of nine days' fighting failed to exhaust the supply."

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*Csicserics v. BACSANY, *Unser neues Feldgeschütz*, p. 27, *et seq.*

At the battle on the **Shaho** during the winter of 1904–05, 200 rounds per day were made available for each field gun and 80 shell and 40 shrapnel per day for each field mortar.

| Engagement | Organization. | Total number of rounds expended. | Numbe of roun expende per pie per day |
|---|---|---|---|
| **Tashihchiao,** July 24, 1904 | 2d Btry., 9th East Siberian Rifle Brigade | 4,178 | 522 |
| " July 24, 1904 | 3d Btry., 9th East Siberian Rifle Brigade. | 1,992 | 249 |
| | | | Averag |
| **Liaoyang,** August 30, 1904 | 1st Btry., 9th Arty. Brig. | 2.600 | 325 |
| " August 30, 1904 | 2d " " | 3,304 | 413 |
| " August 31, 1904 | 1st & 2d Btrs., " | 3,730 | 233 |
| " August 30, 1904 | 3d Btry., " | 580 | 72. |
| " August 30, 1904 | 4th " " | 279 | 35 |
| " August 30, 1904 | 5th Btry., " | 50 | 6 |
| " August 30, 1904 | 1st Btry., 31st Arty. Brig. | 620 | 77. |
| " August 30, 1904 | One Btry., 31st Arty. Brig. | 227 | 16 |
| | | | Averag |
| " August 30 & 31, 1904 | Sixteen btrs., Ist & IIId Siberian A. C. | 108,000 | 422 |
| **Shaho,** October 14&15, 1904 | Four and one-half btrs. 35th Div. | 22,672 | 315 |
| **Mukden,** March 5, 1905 | Three btrs., 9th, Arty. Brig. | 2,100 | 87. |
| " March 3, 1905 | One btry., " | 4,034 | 504 |
| " March 9, 1905 | Three btrs., " | 3,624 | 151 |

## 13. AMMUNITION SUPPLY.

At the beginning of the 19th Century, the Prussians allowed 100–150 rounds per gun (1842: 7-pdr. howitzer, 114 rounds = 979 kg.; 12-pdr. 133 rounds = 941 kg.; 6-pdr. 150 rounds = 654 kg.). During the Franco-German war, there were 157 rounds of ammunition (weighing 769 kg.) available for each heavy gun. At the present time, 280 rounds of ammunition, weighing 1,918 kg., are carried in the battery and in the light ammunition column for each field gun.

**Supply of Projectiles—in terms of the total number available.**
**Smooth-bore Guns, C/42.**

| | Round shot. | Shell. | Shrapnel. | Canister. |
|---|---|---|---|---|
| 6-pdr | 66 | — | 17 | 17 |
| 12-pdr | 59 | — | 22 | 16 |

**Rifled Guns.**

| | Round shot. | Shell. | Shrapnel. | Canister. |
|---|---|---|---|---|
| 9 cm. C/61, until 1866 | — | 63.4 | 31.6 | 5. |
| " after 1866 | — | 92.5 | — | 7.5 |
| 9 cm. C/73 | — | 67.5 | 23.5 | 9. |
| " since 1884 | — | 48.26 | 48.26 | 3.48 |
| 1896 | — | 4.54 | 95.46 | — |

Shell is carried in the limber of the first store wagon only. The limbers and caisson bodies of a field battery (guns) carry shrapnel only—each gun and each caisson limber containing 36, and each caisson body 52 rounds. A field battery has the following ammunition available:*

In the gun limbers, $6 \times 36$ shrapnel $=216$ shrapnel
In the caissons, $6 \times (36+52)$ shrapnel $=528$ shrapnel
In the 1st store wagon.....36 shell.

Total.....780 rounds, i. e., 744 shrapnel, 36 shell, or 130 rounds per gun.

*In a light field howitzer battery, each gun limber contains 24 shrapnel, each caisson limber, 26 shrapnel, and each caisson body, 32 shell. Hence the battery has available:

In the gun limbers.....6 x 24=144 shrapnel
In the caisson limbers.....6 x 26=156 shrapnel
In the caisson bodies.....6 x 32 (shell).....=192 shell

Total 300 shrapnel, 192 shell

In addition, the limber of the first store wagon contains 26 shrapnel.

According to the experience of the Franco-German war, this ammunition was about sufficient for an action lasting one day. Of thirty-seven German batteries engaged at Vionville, only ten had each expended more than the amount of shrapnel at present carried by a field battery. If we assume that a battery will fire four rounds per minute, the ammunition of the firing battery will last two and a quarter hours. When the employment of rapid fire is considered, a supply in the firing battery of 300 rounds per gun does not appear to be excessive. The light ammunition columns of the artillery battalions constitute the first ammunition reserve of the artillery commander, who indicates when and where they shall move. In case the ammunition columns are not as yet up, the artillery commander assigns parts of the light ammunition columns to the battalions that need the most ammunition. The light ammunition column of a field artillery battalion (guns) consists of two shrapnel sections, each of three platoons, each platoon of two caissons, and of one shell section of three platoons, each of three caissons. (Par. 116, German F. S. R.). From this it follows that a field artillery battalion (guns) has available, 1,056 rounds of shrapnel and 792 rounds of shell, a field howitzer battalion, 174 rounds of shrapnel and 1,044 rounds of shell.*

A heavy field howitzer battery carries ammunition in eight caissons only, each of the latter containing thirty-six rounds of shell. In addition, a battalion has available a light ammunition column (par. 118, German F. S. R.), which consists of eight platoons (in all 24 caissons) and carries for each battery six times thirty-six, or 216 rounds of shell. Hence, there are 432 rounds of shell available for each howitzer in the battalion.

*The composition of the light ammunition column of the horse artillery battalion of a cavalry division, is somewhat different.

The German firing battery has only one caisson, or, including the light ammunition column, only 2⅙ caissons available per gun, whereas the French, the Italian, the Russian and the American fir ng batteries each have three caissons available per gun. On account of the great weight of its projectiles, a greater number of caissons is provided for each heavy field howitzer, there being two available in the firing battery and reserve, and 3½, inclusive of the light ammunition column. Assuming a rate of fire of five rounds for every two minutes, a battery will have exhausted the contents of its caissons in two hours. The contents of the light ammunition column will tide the battery over another hour and a half, provided the rate of fire remains the same, and the heavy artillery ammunition columns carry an additional eight hours' supply. Although such a high rate of fire will be exacted in exceptional cases only, the figures given show the advisability of moving the ammunition columns uninterruptedly during the advance, so as to shorten as much as possible, the distance that separates them from the batteries.

A French field battery has 1,248 rounds of ammunition available, or 312 rounds per gun. Gun and caisson limbers contain 24 rounds each, and caisson bodies 72 rounds each.

| | | |
|---|---|---|
| 4 gun limbers, | @ 24 rounds= | 96 rounds. |
| 12 caissons, | @ 24+72 rounds= | 1,152 " |
| | Total | 1,248 rounds. |

Two of the caisson bodies carry shell (*obus explosifs*). Hence the battery actually carries 1,104 rounds of shrapnel (*obus à balles*) and 144 rounds of shell.

## 14. REPLACEMENT OF AMMUNITION.*

*The position of ammunition columns in a route column.* See p. 300, *supra*.

"Timely replenishment of ammunition is of the utmost importance. Every artillery commander is in duty bound

*Pars. 513–521, *German F. S. R.*; pars. 52–79, *German Train Reg.*; pars. 441–460, *German F. A. D. R.*; and pars. 430–439, *German H. A. D. R.*

constantly to regulate it within his command. In addition, all officers and men charged with replenishing ammunition should be animated by the firm determination to supply the firing batteries with ammunition, even when orders or directions to that effect have not been issued." (Par. 441, German, F. A. D. R.).

The ammunition supply of field artillery is replenished first from the reserves, then from the light ammunition column. The limbers are sent to the rear under cover as a rule, and remain with the guns only when a position is to be occupied for a short time. Before they are sent to the rear, gun limbers are partly or wholly emptied, and caisson limbers are always emptied. Visual signal communicatiions established between the battery and the reserve, which is posted about 500 m. in rear of the battery. Gun limbers are promptly refilled at the reserve. One caisson corporal proceeds to the firing battery, takes charge of the signal communications, and informs the commander of the reserve from time to time how much ammunition is on hand. The combat train, including the first store wagon, joins the reserve. The light ammunition columns are posted not more than 600 m. in rear of their respective battalions. The commander of a light ammunition column establishes communication with the battalion commander, with the reserve, and with the ammunition column in rear, and informs himself as to the amount of ammunition on hand. Commanders of batteries, of reserves, and of light ammunition columns endeavor to arrange that batteries changing position go with full caissons. When it is impracticable to transfer ammunition on account of the loss of time that this would involve, full caissons of the light ammunition columns may be exchanged for empty caissons of the reserves.

"No fixed rules can be laid down as to how firing batteries are to be supplied with ammunition. As a rule, an attempt should be made to have the caissons drive as close up to the line as the available cover and the hostile fire admit.

The commander of the light ammunition column should cause timely reconnaissance to be made with this end in view. Lulls in the action will, in many cases, enable caissons to drive clear up into the battery. When caissons are obliged to remain farther off, it will depend upon circumstances as to how ammunition should be transported from them to the guns. As far as practicable, this operation should be supervised by an officer. When the nature of the ground and the distance to the firing battery admit, caissons may be unlimbered and the caisson bodies, partially emptied, if necesssary, run into battery by hand by the personnel of the light ammunition column, the men during the movement utilizing the cover afforded by the caisson body. When this is impracticable, the caissons are emptied, and the ammunition carried to the guns by the men of the light ammunition column. When circumstances imperatively demand it, caissons must be driven clear into the battery under fire. In this, it is of course essential that the caissons move unexpectedly and rapidly, and that they be quickly emptied and brought off to the rear.

"The empty caissons, or, if unlimbered, their limbers, move back to the position of the light ammunition column. All the men belonging to the light ammunition column, except those that have been kept in the firing batteries to replace losses, follow assembled in caisson squads." (Pars. 454 and 455, German F. A. D. R.).

"When the battalion approaches its position, the battery reserves are moved by their respective commanders to a point in rear of their batteries and are there posted under cover as soon as the position is occupied. Battery reserves should pay special attention to communication with their batteries, and to cover, at least from the view of the enemy. They should be posted about 300 m. in rear of their batteries. In exceptional cases, all the reserves of the battalion may be united and posted together." (Par. 328, German F. A. D. R.).

The ammunition of the heavy howitzer batteries is taken f om the caissons of the firing battery and deposited near the guns. Limbers and caissons move to the rear to the reserve, with which they may be consolidated. In order that they may be secure from fire directed at their battery, they must go about 500 m. to the rear. This applies likewise to the reserve. The combat train joins the reserve. The commander of the reserve establishes personal communication either by means of orderlies or by means of visual signals with the battery and takes timely steps to ensure that filled caissons reach it. The light ammunit on columns attached to the heavy howitzer battalions follow in rear of those of the field artillery, or at the tail of the combatant troops. With the approval of the commander of the troops, the commander of the heavy artillery directs the light ammunition columns of the heavy artillery to move forward. This order is usually issued at the same time that the heavy artillery moves forward from its place in the route column. The light ammunition column of a heavy artillery battalion is posted about 800 m. in rear of the batteries. Empty caissons of the batteries and battery reserves are exchanged for filled caissons of the light ammunition column. Empty light ammunition columns move back to the ammunition column, where they are refilled.

The ammunition columns of an army corps* are assigned to both the Ist and the IId echelon of trains and columns. The light howitzer ammunition column is with the Ist echelon. When an engagement is imminent, a whole or half of an ammunition column and a field hospital or two may march as a *combat echelon* ahead of the field trains or just in rear of

*An *ammunition train comprising 2 infantry and 4 artillery ammunition columns* (one of the latter containing ammunition for light field howitzers) consists of 1,180 men, 1,165 horses, and 185 carriages, and takes up a road space of 3,815 m.

An *ammunition train comprising 2 infantry and 3 artillery ammunition columns* consists of 997 men, 972 horses, and 146 carriages, and takes up a road space of 3,200 m.

The *ammunition train of a heavy howitzer battalion* consist of 8 heavy artillery ammunition columns with a total strength of 860 men, 810 horses, and 163 carriagesf and takes up a road space of 2,600 m. Each one of the caissons contains 36 rounds of shell weighing 11,606 kg.

the troops. The senior officer with this combat echelon commands it, unless a commander has been specially designated. (Par. 447, German F. S. R.)

The ammunition columns with the IId echelon, relieve those of the Ist echelon or replenish their ammunition supply, and bring up ammunition from the advanced base or from the transport of the line of communications.

The commander of the ammunition columns regulates the movements of the artillery ammunition columns in accordance with orders issued by the corps commander, or, when they are attached to divisions, in accordance with orders issued by the division commanders. But this does not relieve him of the responsibility of moving the columns forward on his own initiative when a battle has begun. The orders for the forward movement of the ammunition columns should be given as soon as it appears probable that a serious action will be fought. It is only by doing this that an orderly replenishment of ammunition can be assured. When the ammunition columns are brought up too late, it may be impossible to avoid sending their caissons directly up into the firing batteries to cover a pressing need of ammunition. The commander of the troops informs the commander of the artillery of the time and place of the probable arrival of the artillery ammunition columns. From these the light ammunition columns are refilled as far as practicable on the battlefield. When time is pressing, artillery ammunition columns or parts thereof may be brought up to the firing batteries, and filled caissons may be temporarily turned over to the troops.

After an action, the ammunition, men, horses, and matériel required by batteries to make good expenditures and losses, are, as a rule, taken directly from the artillery ammunition columns, which are brought up for the purpose. After every engagement, commanders of artillery units have to render a report to the commanders of troop units of which their organizations form a part, specifying whether or not am-

munition has been replenished, and if not, the reasons for not replenishing it. (Par. 74, German Train Regulations).

Artillery ammunition columns are required to supply ammunition to troops of other units than their own when requested to do so and the situation of their own unit permits. Light ammunition columns do this only when ordered to do so by the commander of the force of which they form a part. Empty ammunition columns of the combat echelon and of the Ist eschelon return to the IId echelon, half a column at a time. As soon as two empty half-columns have thus joined the IId echelon, no matter whether they are parts of infantry, artillery, or heavy artillery ammunition columns, they are, in general, sent to the rear to refill. They are refilled at the advanced base, or from motor trucks, railway cars or other transport of the lines of communication.

During the **Franco-German war** it was very often necessary for ammunition columns to supply units other than their own with ammunition. At **Vionville,** for example, the ammunition columns of the IIId Army Corps issued ammunition to a number of batteries of the Xth Army Corps, and the batteries of the Xth and of the VIIIth Army Corps, which did not arrive on the field until the afternoon, supplied ammunition to the batteries of the IIId Army Corps.

At **St. Privat,** August 18th, 1870, the ammunition train of the IXth Army Corps first took station near Villers-aux-Bois, and was later brought forward to the battlefield. The ammunition columns advanced as far as Vernéville, where mounted men of the various batteries received the caissons destined for their respective batteries, and took them to their batteries. A rendezvous position was designated for the empty caissons 500 paces in rear of the firing batteries. The caissons that were sent forward later, sent their teams back to this position.*

The Ist Echelon of the ammunition column of the Guard Corps detrained at Kaiserslautern on August 4th, 1870, the IId Echelon at Mayence on August 8th, 1870. The latter reached Dieulouard on August 17th, after a series of hard marches. On the same day, the Ist Echelon reached Sponville, immediately in rear of the Guard Corps, which was concentrated at Mars-la-Tour. On August 18th, the ammunition columns (Ist Echelon) were first posted near Doncourt, and later between Habonville and Batilly. The IId Echelon, meantime, had marched via Thiaucourt to the battlefield, a distance of 55 km.

At 2 P. M., August 19th, 1870, all the ammunition columns had been emptied of their contents, had furnished 114 men and 205 horses to re-

*HOFFBAUER, *Deutsche Artillerie*, V, p. 185.

place losses in the batteries, and were in march via Pont à Mousson to the field ammuntion park at Herny. As they were unable to obtain ammunition here, they continued their march to Saarlouis. After receiving their ammunition, they marched westward, learned that the Guard Corps formed part of the Army of the Meuse, found the trail of that corps and hurried after it without specific orders, completing their teams on the way by requisitioning horses. On the 29th, the first of the columns again reached the army corps, and by the 31st all of them had rejoined. The 1st column had covered 338 km. in 10 days, the last 375 km. in 12 days. One day should be deducted from the 10 and 12 days respectively, as it was taken up in receiving and packing ammunition. On September 6th, the columns again marched toward Saarlouis, and on the 19th they arrived in front of Paris, having traversed about 540 km. in 14 days. The columns marched both morning and afternoon, cooked a meal at noon, and went into bivouac each night covered by their own men, who were armed with the rifle.*

The 1st Artillery Ammunition Column of the Ist Army Corps was brought forward to Remilly on August 31st, 1870 (battle of Noisseville). It utilized the night from August 31st to September 1st, to replenish the ammunition of the batteries, marched the next forenoon to Saarlouis, returned the succeeding night, and arrived again in St. Barbe, after a night march of 45 km. The column had covered 135 km. in 48 hours. "Considering the hard forced marches demanded by the pressing nature of the circumstances, it is not surprising that a good many horses dropped dead in their tracks, and that many others strained tendons and muscles.†

**a. France:**‡ The ammunition of the caisson bodies of the gun sections is used first. These caisson bodies contain 72 rounds apiece; they are upended 50 cm. to the left of their respective guns, and their doors opened. The ammunition contained in the caisson bodies of the 5th and 6th caissons (*caissons de premier ravitaillement*), which are posted on the flanks of the battery, is transferred to the caisson bodies of the gun sections as the latter are emptied. The other six caissons of the battery are posted about 500 m. in rear of the firing battery and form the battery reserve, one officer commanding all the battery reserves of the battalion. Full caisson bodies from the battery reserve replace the two caisson bodies of the 5th section (*caissons de premier ravitaillement*), which then return to the battery reserve. Here they are refilled from the limbers, if the caissons of the ammunition columns are not as yet up, the contents of the gun limbers being, in any case, used as a last resort. If the battery commander desires to use shell, he orders up from the reserve the two caisson bodies containing it (144 rounds), and indicates where they shall be posted. The battalion commander, when informed by the commander of the reserves that a battery is running short of ammunition,

*HOHENLOHE, *Militärische Briefe*, III, p. 121.

†HOFFBAUER, *Deutsche Artillerie*, IV, p. 130.

‡*Instruction sur le remplacement des munitions*, VIII, 1902.

may direct the deficiency to be supplied by the issue of ammunition belonging to other batteries.

The battery reserves replenish their supply from the three echelons ofthe corps ammunition park. A number of artillery ammunition sections of the Ist echelon are pushed forward and posted 1,000 or 1,500 m. in rear of the battery reserves. From this position, caissons are then sent to the battery reserves, where they are emptied, their contents being transferred to battery caissons. Empty ammunition sections go back to the IId echelon, 15 km. away, where they are refilled, while full sections are again sent up to the Ist echelon. The ammunition of the IId echelon is replenished in a similar manner from the IIId echelon, and that of the latter from the artillery park of the army.

Each piece has available in the corps, 501.5 rounds of ammunition, distributed as follows:

| | | | |
|---|---|---|---|
| With the battery | | | 312 rounds. |
| In the corps park | Ist echelon | 62.6 rounds | 189.5 " |
| | IId echelon | 62.6 " | |
| | IIId echelon | 64.3 " | |
| Total | | | 501.5 rounds. |

**b. Austria:** Each infantry division,* has 4 field artillery ammunition columns consisting of 24 caissons each, and 4 howitzer ammunition columns consisting of 12 caissons each. The caissons of the 1st and 2d columns are armored, so that they can be exchanged for battery caissons. The ammunition in limbers may be unloaded beside the guns. The caisson bodies of the batteries are emptied and replaced by full caisson bodies of the 1st and 2d ammunition columns. The ammunition of the caisson limbers is transferred to the gun limbers as soon as the latter are emptied.

## 15. REPLACEMENT OF PERSONNEL AND MATÉRIEL.†

"Every battery engaged with the enemy should strain every nerve and utilize all its resources to remain ready to move or to fire at any moment." (Par. 461, German F. A. D. R.).

Batteries are never withdrawn while under fire, but supported by pushing others up into the line. Even severe losses do not in themselves justify evacuation of the posi-

*A cavalry division has a cavalry ammunition column that carries both small arms and artillery ammunition.

†Pars. 461–463, *German F. A. D. R.*

tion. If a battery that has succumbed in the fire fight were to be withdrawn, the battery that replaced it, might perhaps not produce an effect at all, as it must first adjust its fire, but would in all probability break down while going into position, there being no more vulnerable target than a battery in the act of unlimbering. Besides, the forward movement of the teams with a view to bringing off the guns would invite the enemy to redouble the intensity of his fire, unless the terrain affords cover to the movement.

Each battery possesses sufficient matériel in its battery reserve for keeping the guns and their limbers fit for action a long time. When a battery is unable to make the necessary repairs with the means at its disposal, the commander of the reserve takes timely steps to procure what is needed from the light ammunition column. The latter is obliged to turn over to the batteries not only any matériel that they may require, but also to replace their losses in men and horses, even if this entails disintegrating the ammunition column. When necessary, the battalion or the regimental commander may direct another battery to furnish what is needed. So far as practicable, such assistance should be rendered even to batteries belonging to another unit. In so far as possible, repairs should be made during the action, but when this is impracticable, repair work should be started as soon as the action is over. Spare parts and tools for making repairs are carried in the first store wagon of the battery reserve. In addition, there is available with the field train, the second store wagon with field forge. Artillery should therefore be specially interested in quickly bringing up the field train as soon as an engagement is over.

Losses among the cannoneers are first replaced from the men attached to the caissons. A battery thus has a little more than an extra set of cannoneers. As a last resort, the drivers are used as cannoneers. A battery can continue its fire—though at a considerably reduced rate—so long as two men still remain with each gun, or three with each how-

itzer. When a battery is about to succumb, its commander may stop the firing in order to refit, so that it may be able to take a hand in the infantry fight during the later stages of the action. (Par. 374, German F. A. D. R.). Chiefs of section are more difficult to replace than any other men of the battery.

"Capable chiefs of section (*Geschützführer*) are by no means numerous in a newly mobilized battery, because in the artillery the corps of non-commissioned officers is drained to a far greater extent than in the other arms, by details to new organizations. When, in addition, the few remaining professional non-commissioned officers are disabled in the first battle, the problem of providing substitutes becomes really embarrassing."*

An endeavor should always be made to shelter the teams as much as possible from hostile fire, but it will be impracticable to protect them altogether against losses. When the batteries desire to change position, or to accompany the attack, the teams must be brought up; and it will be impossible to move to the new position without suffering some loss *en route*.

The loss of saddle animals is particularly serious. "In the endeavor to render the combatant part of the battery, the guns, as ready and fit for service as possible, I assigned almost all the horses of the permanent establishment, including all available saddle horses, to gun teams and drivers on mobilization. As the horses that came to the battery by purchase (augmentation horses) were almost without exception untrained to go into a six-horse team or to work under the saddle, I assigned them to the reserve and combat train. But, at Mars-la-Tour, we lost all of our officers' horses, and the greater part of the mounts of chiefs of section, trumpeters and non-commissioned officers. Where were substitutes to be obtained? We did find a few suitable mounts among the gun teams, and used them, but the best of these were gone and there seemed no way out of the dilemma."† The battery lost 23 of its 126 horses.

In 1870–71, a horse battery consisted normally of 150 men, and 207 horses, and a field battery of 151 men and 126 horses. At **Vionville**, six out of twelve field batteries lost more than 40 horses each, and three horse batteries lost respectively, 59, 41, and 70 horses. In spite of this loss, all

*BERENDT, *Aus meiner Dienstzeit*, p. 74.—See p. 426, *supra*.

†*Ibid.*

but four of these batteries were able by the morning of August 18th, to turn out with complete six-horse teams.

On August 18th, 1870, the batteries of the IIId Army Corps, had to take part in the battle of **Gravelotte,** after having made a long march. The ammunition columns had furnished 171 horses to the batteries and were obliged to replace these by requisitioning others on their march to the rear.

In the future also, we shall make frequent use of the expedient of drawing on the ammunition columns for teams,* for a battery that has lost half of its personnel and horses, can not bring its guns into position without immediate assistance. Each caisson of the ammunition column can without difficulty spare two horses, until others arrive from the rear, as it will still have four horses, which suffice to draw the empty caisson. In addition, led horses are available. Each artillery ammunition column could thus furnish 50–60 horses, and all the field artillery ammunition columns of an army corps, about 350–420 horses.

*The horse depôts are to replace disabled horses of various headquarters of infantry (including machine gun companies), of pioneers (including bridge train), of corps telegraph detachments, of telephone detachments, and of field supply depôts of the army corps. In urgent cases, the corps commander may direct machine gun batteries, cavalry, field artillery, heavy artillery, ambulance companies, and train organizations of the army corps, to draw horses from the horse depôts." (Par. 117, *German Train Regulations*).

## IV. THE ATTACK.

### 1. THE COÖPERATION OF INFANTRY AND ARTILLERY.

Artillery, regardless of the losses it may suffer in consequence, should always combat the target that makes it most difficult for the infantry to attain the object of the action. The hostile infantry is the principal target. Artillery should engage the hostile artillery only to the extent of preventing the latter from firing undisturbed. In order to place modern artillery out of action, numerous curved fire guns must be brought into action, and even then this object will not be completely attained, for some of the hostile batteries will be able, again and again to develop their full fire power. The victor will find on the battlefield but few batteries that are shot to pieces. He is much more apt to find them immobilized. The regulations of the nineties still insisted that the success of the infantry attack depended, in the main, upon the attainment of the superiority of artillery fire.* But, he who waits until this superiority is gained will never get to attack.

The artillery combat is no longer a special act of the drama of the battle. It will not so much precede as accompany the infantry attack to the very last. Close coöperation between artillery and infantry is more necessary than ever before.

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*Germany: Par. 344, *F. A. D. R.* of 1899: "A planned atack has a chance of succeeding only when the superiority of fire, in the first place that of artillery, has been gained."

Par. 82, Part II, *I. D. R.* of 1899: "In the first place, the superiority of artillery fire should be gained, to smooth the way for the infantry."

France: *I. D. R.* of 1904 (German guns without shields being considered the targets): "Artillery during the preparatory stage: An attempt should be made to overwhelm the hostile artillery as quickly as possible, but without engaging more force than absolutely necessary. * * * *It is not until the preparation is considered sufficient that the commander of the troops gives the order for the attack.*"

**England:** F. A. D. R. of 1907: "The artillery and the infantry must coöperate, the former by firing rapidly when it sees that its own infantry has trouble to advance, and the latter by taking advantage of this period of intense artillery fire, to gain ground to the front. The closest coöperation of guns with the infantry firing lines is essential. Communication between infantry and artillery commanders is of the utmost importance and the way should be paved for it whenever circumstances admit. All orders for the infantry attack should be communicated to the artillery commander and arrangements made to have the guns continue their fire until the last possible moment. Infantry is most effectively supported by concentrating the fire of guns and of howitzers upon the point to be attacked. The shrapnel fire of the guns will *nail* the enemy to his trenches, force him to keep down, interfere with his aim, and divert his attention from the advancing infantry. The fire of the howitzers, whether it consist of shrapnel or of lyddite shell, will sweep the interior of the enemy's trenches and their approaches, and retard the movement of his reserves. Should the attacker's artillery be forced to discontinue its fire in view of the superiority of the hostile artillery fire, it must open fire again at any cost, when it becomes necessary to help the infantry ward off an attack, or to repel a counter-attack. When the infantry has approached so close to the hostile position that it masks the fire of its own artillery, the latter should continue its fire at a greater elevation in order to sweep the ground in rear of the hostile position and to prevent the advance of hostile reserves."

The fusion of infantry and artillery preparation is the basic principle of the new tactics. Nothing but mutual coöperation of infantry and artillery, directed by the commander, will assure success. The danger that the artillery combat may degenerate into an ineffective cannonade, is obviated by the demand that the infantry force the defender, while the artillery combat is still in progress, openly to engage his troops, especially his masked batteries, so that they will form targets for its own artillery. It is very difficult for artillery to combat advancing infantry from a masked position, especially when it is not a question of hitting a few targets, as on the target range, but one of hitting groups of numerous targets,* and the observations of the battery

*General RICHTER, *Beitrag zu dem Zusammenwirken der Infantrie und Feldartillerie bei der 5. japanischen Division in der Schlacht von Mukden. Jahrbücher für Armee und Marine*, July number 1909. In 1896, General LANGLOIS stated that infantry could never unaided gain the fire superiority over the defender, because its action alternated between movement and firing, whereas the defender fired uninterruptedly, and that artillery unaided was just as little capable of effectively preparing the assault. For, he argued, as soon as artillery directs its fire against the

commander, who is some distance away from his guns, can not be used in the battery without risk of error. Par. 374, German I. D. R., is particularly important. To quote: "*Although an attempt should be made to gain beforehand a superiority of artillery fire, the execution of the infantry attack should not be made absolutely dependent upon it. The tactical situation is the governing factor.*" The drill regulations of the field and heavy artillery enunciate similar views. But there is unquestionably great danger of the infantry attack bolting to the front, of advancing too hurriedly, before the artillery has created the conditions upon which success is predicated. A warning against the "headlong attack" is justified, even in peace times. Before Mukden, General Oku made the following statement in one of his orders: "The infantry *must* advance, no matter how slow its progress. When it is not as yet possible for the infantry to advance, the artillery should hold its fire. The advance of the infantry and artillery must proceed simultaneously." This statement is now embodied in the Japanese regulations.

An attempt will now be made to present a detailed statement of the demands of the two arms in attack.

1. The occupation of the position and the adjustment of fire take time. In a rencontre, it will frequently be impossible to avoid engaging the artillery prematurely (par. 357, German I. D. R.) when the advance guard requires the support of artillery in order to fulfill its mission, or when an attempt is to be made to clear up the situation by means of artillery fire." (Par. 361, German I. D. R.). When attacking an enemy deployed and in position on the defensive, the premature advance of the infantry must not impel the artillery to precipitate and hurried action.* The infantry

point of attack, the defender, utilizing all the natural and artificial cover available, would withdraw from its fire, unless the infantry of the attacker advances to close range and threatens an immediate attack, thereby forcing the defender to come out from his cover and to present to the artillery firing over its own infantry a welcome target for its death-dealing shrapnel.

*The attempt made at Gravelotte by the 1st Battalion, 8th Field Artillery which was posted in readiness, to go prematurely into position in order to divert the hostile fire from the recklessly advancing infantry is of questionable utility and should be avoided.

should not advance until the artillery is ready to support it with fire.

The artillery must demand such protection of infantry in its vicinity as to enable it to go into position quietly and unmolested. As the first positions of the artillery will generally be masked or semi-masked, it has little to fear from the frontal fire of hostile infantry, but may be molested by small hostile detachments and machine guns, which will endeavor to bring oblique fire to bear on batteries that have pushed recklessly forward. In a rencontre, it is the duty of the advance guard to secure the selected artillery position and its observation points. Important points, particularly commanding heights that lie in advance or on a flank of the artillery position, should be promptly seized. "The flanks and rear of the artillery position are particularly vulnerable to the daring and sudden operations of small detachments. In open country, artillery in position protects its own front by its fire. It is only in case the artillery line is long that a small infantry force is required in front to prevent the enemy's patrols from annoying the artillery. Small detachments of infantry posted at considerable intervals suffice for this purpose." (Par. 448, German, I. D. R.).

2. The advance of infantry past or through artillery lines, must not materially impair the artillery fire. In any event, the infantry and artillery commanders concerned should agree beforehand on the time when and the place where the movement is to be made. (Par. 445, German I. D. R.). In many cases, it will be practicable to pass at one bound through the batteries that are not as yet engaged but ready to fire. When the guns are in a masked position, they can resume firing as soon as the infantry has cleared the crest in their front.

3. The artillery should demand that infantry force the defender to man his parapets and to offer targets to shrapnel in order that it may be enabled thereby to distinguish masks and dummy works from the true position. The

artillery must, in the first place, know how close its infantry has gotten to the hostile position. It is a good plan to attach artillery officers to the infantry (par. 376, German F. A. D. R.). This is the only method that ensures that the results of the infantry reconnaissance will be communicated to the artillery and that the infantry will seek hostile observation stations and direct its fire upon them. Observation stations are the eyes of artillery that is posted in a masked position; when these are put out, the fire effect ceases. Batteries in masked positions will then be forced to leave their cover and may be annihilated. This attack against observation stations is a new and important element in modern combat. Par. 593, German F. S. R., emphasizes this point particularly, by saying: "The outcome of the combat of two lines of artillery that are numerically approximately equal, depends largely upon the use of that arm and *upon the coöperating activity of the infantry*. It is no longer possible to accomplish anything with frontal fire, but it is practicable to interfere with the movement of hostile guns from the masked to the unmasked position and to rob the hostile artillery of freedom of movement and to cripple its ammunition supply service.*

4. The artillery may and should demand that all the wishes of the infantry be communicated to it.

The infantry demands—

(*a*) That during the advance that has been begun to give the artillery a chance, it be not left without support and at the mercy of the hostile artillery fire, in other words, that the hostile artillery be silenced, or at least completely occupied. The activity of a hostile battery posted in a masked position may be crippled by firing upon its observation station. This should be sought at points permitting good view, its firing battery being perhaps posted in what would seem to be an entirely unlikely place. In many cases, a cloud of smoke projected in front of a hostile battery in a masked position, may suffice to cripple its activity.

*Hoffbauer, *Deutsche Artillerie*, III. p. 66.

(*b*) That the artillery render it all possible assistance, to enable it to overcome a crisis, and that the artillery prevent the hostile infantry from firing undisturbed.

(*c*) That the artillery protect it in critical situations, particularly after a successful assault, by hurrying forward into the captured position.

(*d*) That the artillery support it in the combat for the possession of villages. "In particular they (the higher artillery commanders) should see that the maximum effect is obtained at the right time and at the proper place, by concentrating and accelerating the fire. To this end, they must constantly observe the enemy and the conduct of their own troops and supplement their own observations by information gathered by officers' patrols and scouts." (Par. 426, German F. A. D. R.).

For the commander of the troops to inform the artillery commander against what point he intends to launch the decisive attack (par. 470, German F. A. D. R.), by no means solves the question of mutual coöperation. The artillery commander should carefully observe the leading infantry line in order that he may perceive at once where assistance is needed. Infantry detachments that have prematurely rushed forward and that can facilitate the advance of the following units, require effective artillery support. A check in any movement or an advance by groups or other units, is always an appeal to the batteries to furnish support with their fire.

The difficulties of providing coöperation between infantry and artillery are due to the elimination of powder smoke and the adoption of neutral tinted uniforms, which makes it impossible to distinguish friend from foe at all times with certainty (though "assault guidons" may help), and to the circumstance that, while we have a signal (*gv*) directing artillery to increase its range, we have none indicating that artillery is to concentrate its fire upon certain points. In England it has been proposed to indicate the point

upon which fire is to be concentrated, by means of the colored ball of smoke of a special projectile. Morse signals are not clear enough and are liable to be misunderstood. The Swiss have adopted a very good scheme, which consists of holding aloft all signal flags to indicate to artillery that it is to increase its elevation. To give each leader in the skirmish line authority to indicate the points against which the fire is to be directed, would not be permissible. This authority belongs properly to the officer commanding a combat section—usually a regimental commander. In many cases, it will be advisable to direct some artillery unit (for example a battalion) to support the advance of the 1st infantry regiment against the line a—b. It is only by issuing orders in this form that coöperation of infantry and artillery can be ensured, otherwise that coöperation will be entirely a matter of chance. The operation of the scheme mentioned is facilitated by the fact that the relative strength of the infantry and artillery of a division is such that an artillery regiment will naturally be assigned a combat section equal in extent to that assigned to an infantry brigade. Telephone lines that connect the different brigade headquarters with division headquarters on the one hand and with the headquarters of the artillery regiment on the other, prepare the way for mutual coöperation. But visual signal communications must be maintained in addition, as interruption of the telephone service is inevitable. Mutual visibility of the troops concerned does not suffice, as this might give rise to mistakes, and as the fire of the artillery would be governed more by the movements of the enemy than by the effect of his fire, which the artillery can not in every case perceive. Moreover, the artillery might frequently direct its fire against points that the infantry does not intend to attack or that it can not as yet capture.

Artillery reconnaissance officers sent ahead keep up communication with the various infantry headquarters and transmit the necessary technical information in regard to the

targets, the distance of the firing line from the enemy, the location of hostile machine guns, etc.. One officer at each headquarters will rarely suffice for this work, and two will therefore be sent in most cases, one remaining at the headquarters of the infantry unit, the other accompanying the advancing infantry line. Panoramic sketches on which the various parts of the target are indicated by means of letters, will often prove useful, if sent back promptly. If artillery reconnaissance officers are disabled or not available, infantry officers perform their duties. It requires strict attention on the part of the infantry to make its work harmonize with that of the artillery. Every opportunity, as when the hostile infantry is forced under cover by a burst of fire, should be utilized for advancing. This is particularly emphasized by the French (see p. 460, *infra*), who are of the opinion that the fire of their artillery can overcome any check produced by hostile fire, bring the advancing troops almost unharmed close to the enemy, and protect them against any counter-attack. The defender is to be blinded by smoke and by a hail of shrapnel. "Every rafale of the artillery will either cause the most advanced line to make a rush, or the troops of the rear line to come up to the firing line in order to reinforce it, or carry it forward as much as possible. Thus the rafale becomes a veritable shield for the infantry (*veritable bouclier de l'infanterie*)." LANGLOIS.

In infantry combat exercises, by far too little attention is paid to utilizing this moment for advancing by long rushes of strong groups under cover of the smoke-clouds of a rafale.

Field and heavy artillery should likewise coöperate under the direction of the commander of the artillery, who regulates their reconnaissance and fire action. The long range and certain action of the heavy howitzer, which fires shell model 1904, whose radius of action is very great, should be utilized to silence, one section at a time, shielded batteries whose position has been recognized, or to keep down the fire of such batteries (by distributing the fire over their entire

front), in order to relieve as many field batteries as possible from this work and to enable them to direct shrapnel fire against the hostile infantry position and against hostile curved fire batteries in masked positions. The attention of hostile batteries that have been silenced or that have not as yet been taken under fire, should be occupied. Field artillery will frequently be able to take advantage of the cover afforded by the fire of the heavy artillery to go into position. Finally, the commander of the troops demands that the point of attack be kept under effective fire. Fortified villages offer less resistance to heavy shells than do supporting works of low profile.

## 2. ARTILLERY IN A RENCONTRE.*

In a rencontre in which a route column deploys against an enemy who is still in the act of advancing, the advance guard is to gain time and room for the deployment of its main body, throw the enemy upon the defensive, and dictate his course of action. The principal share of this task falls to the lot of the field artillery. The commander will find it very difficult adequately to protect his rapidly forming artillery lines with infantry, which marches more slowly, unless heavy howitzer batteries, which are able to play a powerful part in such a situation, have been brought into position at a timely moment. The unexpected collision of two opposing forces, which often happens at maneuvers, produces a critical situation. A skillful commander will be able, in many cases, to hasten the entry of the troops into action by making proper preparations, but it will be unavoidable sometimes to accept battle in a tactically unfavorable locality. The endeavor to terminate the fight as quickly as possible by launching the troops promptly, is characteristic of the rencontre. When this desire animates both opponents, it leads quite naturally

*Pars. 475–482, *German F. A. D. R.*, pars. 414–428, *German H. A. D. R.*, and *Taktik*, V, p. 193, *et seq.*

to a piecemeal launching of the troops by battalions; when, on the other hand, one of the commanders decides to stand on the defensive, a lull favorable for a united launching of the troops will occur.

Modern field artillery has imparted an entirely new character to rencontre fights such as the combat for the heights of Gorze during the battle of Vionville, and the actions incident to the invasion of Bohemia.

A commander who desires to avoid being surprised by hostile fire while he is on the march, must take steps to keep himself informed, by extensive reconnaissance, of the measures taken by the enemy. But to reconnoiter only within effective range (4 km.) does not suffice; the reconnaissance should extend for at least double that distance (i. e., 8—10 km.), as time must be allowed for transmitting messages to the rear and for ordering and taking counter-measures. This requires that the cavalry assigned to the unit be pushed far ahead. As patrols are not strong enough to penetrate the hostile screen, the divisional cavalry, reinforced if necessary, must be used for this purpose.* The French scheme of surrounding the force with a belt of independant detachments undoubtedly has its advantages. The difficulties encountered in reconnaissance produce a protracted period of uncertainty in regard to the actions and intentions of the enemy. This uncertainty exerts, above all else, a hampering influence on the actions of the artillery. The commander should always ask himself the question, where will my troops come under artillery fire? when can I fire upon the hostile route column (fire surprise)?† and where will the covering forces collide?

"A commander who desires to derive the utmost benefit from his rapid fire guns, must seek to get them ready for action as early as possible, i. e., ahead of the enemy's artillery."

*Streffleur, February number of 1909: HORSETZKY, *Eindrücke vom Artillerieinformationskurs.*

†If we assume that it will take 40 seconds to adjust the fire with three bracketing shots, and 30 seconds for giving the necessary commands and for laying, the first round for effect (time fire) can be fired two minutes after the first shot.

(HORSETZKY). This naturally results in posting artillery in readiness, for the purpose of at once protecting the infantry, which would otherwise be defenseless at the mercy of the hostile artillery fire. This is also advisable when infantry is crossing difficult ground or broad valleys, and when the weather is hazy.* The difficulty of following the infantry, of moving from one position to another, lies in bringing up the artillery at a timely moment. This requires that the next position be reconnoitered early and that orders be transmitted by signals. If possible, the artillery should be in its new position by the time the infantry has reached the next crest. Whether the batteries should change position simultaneously or by echelons depends upon the situation. The movement by echelons, if properly timed, affords the best protection to both artillery and infantry.

The employment of the artillery of the Vth Army Corps at **Nachod**, growing as it did out of the position the artillery occupied in the column, is very instructive.†

At 5 A. M., June 27th, 1866, the Prussian advance guard and the head of the main body were 15 km. apart. The early occupation of the Wenzelberg plateau was considered desirable, but as the distance to the nearest supporting troops was great and could not be increased except for the most pressing reasons, the advance guard commander decided to postpone the departure of his advance guard an hour. At 8 A. M., when the leading elements of the support reached the height south of Wysokow, the head of the reserve was still 4 km. from the road fork east of Wysokow. It was expected that by 9 A. M., 7½ battalions, 5 escadrons, 2 batteries, and 2 pioneer companies would be on the battlefield of Wenzelberg. At this time, the elements of the column were disposed as follows and resumed their march after a long halt:

*Wunck's Cav. Brig.* (8 esc., 1 btry.) at Sackish, 10 km. from the heights of Wenzelberg;

*Main body* (12 bns., 8 esc., 5 btrs.) at Gellenau, 12 km. from the heights of Wenzelberg;

*Reserve* (3 bns., 8 btrs.) at Lewin, 15 km. from the heights of Wenzelberg.

The result of assigning so few guns to the advance guard, which was entirely dependent upon its own infantry until 11:30 A. M., and of pushing

*It should be remembered that in hazy weather the light conditions may change every few moments.

†KÜHNE, *Kritische Wanderungen*, I, p. 2, *et seq.*
BRÜCKNER, *Die Feldartillerie im Begegnungskampf.*

it still farther forward, was that it had to cover entirely too much front (5 bns., and 2 btrs., on a front of 2,500 m.), and that the artillery, which usually arrived a battery at a time, was split up and never succeeded in gaining the superiority. General von Steinmetz had 90 guns, 30 of them smooth-bores, whereas his opponent had 88 guns, all of them rifles.

There were in action:

| Austrians | | Prussians | |
|---|---|---|---|
| 8 A. M. | 8 guns | 12 guns | |
| 9 A. M. | 32 " | 12 " | |
| Noon | 80 " | 18 " | (Horse btry. of the Cav. Brig. arrives) |
| 1 P. M. | 80 " | 26 " | (Ohnesorge's Btry. silenced) |
| 2 " | 80 " | 38 " | (One btry. of 12-pdrs. can bring only 2 of its guns into action) |
| 2:30 P. M. | 80 " | 74 " | |

If orders had been issued in time, the artillery of the reserve could have arrived on the field between 12 o'clock Noon and 1 P. M.

The advance guard batteries remained in action. The successively arriving batteries of the cavalry brigade and of the main body suffered severe losses in going into action uncovered and were temporarily silenced. It was not until the batteries of the reserve arrived in one body, that the scales were turned.

"At the beginning of the fight, the advantage will rest with the commander who understands how to ensure to himself freedom of action by gaining a start over the enemy in preparation for action. The artillery can materially assist the commander of the troops in this, by making dispositions and movements promptly."

As a preparatory measure, the artillery should be taken out of the main body and brought up to the tail of the advance guard, and the light ammunition columns should be brought up into the gap left in the main body by the artillery. In this way, a higher state of preparedness for launching the force is attained. In many cases, it will likewise be practicable to prepare for the development of the infantry by having the head of its subordinate units turn out of the column.

The distance between advance guard and main body will be decreased by bringing up the artillery of the main body. It is, consequently, just as well to dispense with a large advance guard, and to have the entire column of the army

corps follow in rear of a single battalion* pushed forward 1,000 m. The German F. S. R. (par. 169) therefore very properly recommend that only the most necessary dispositions for protection be made, in order that the development forward may be hastened.

That there is danger that the main body may suddenly come under artillery fire, can certainly not be denied, but this danger may be obviated by energetic reconnaissance and by a proper employment of the advance guard artillery. The purpose of the distance between advance guard and main body is, above all else, to give the commander of the troops time, in case of collision with the enemy, to decide what to do.

An infantry attack undertaken without artillery support worth mentioning, runs danger of being converted into disaster when exposed to a sudden burst of hostile artillery fire. If the attack, in such a case, is made with energy and dash, the disaster will be all the worse. As a rule, troops do not easily forget such an experience. Colonel Csicserics von Bacsany† states: "From the Russo-Japanese war, we may draw the conclusion that, after the opening battles of a war, an army will have to use a certain circumspection, not to say caution, during the preparatory stage of combat. The Russian defeats are interesting proof of the fact that an army that is not prepared to use this necessary deliberation is very apt to become quite unenterprising in spite of the dash carefully inculcated in time of peace (the bayonet cult), and loses nearly all its effectiveness in spite of all bravery."

The advance guard is to gain the time and room necessary for the deployment of its main body. The artillery position selected by the commander of the force must, above all else, be secured. The advance guard may find itself in a situation that forces it to overcome unexpected resistance

*It should be borne in mind that the German battalion of 1,056 men is here meant.—*Translator.*

†*Die Schlacht*, p. 24.

quickly, or to hold captured supporting points stubbornly even against superior numbers. The artillery attached to the advance guard may, with advantage, be used for these tasks. In order to keep the enemy in the dark as to one's intentions and dispositions, it may be advisable to post the elements of the advance guard artillery at wide intervals and in masked positions.

The artillery must make the best of the terrain it finds. No time should be wasted in looking for ideal positions. Our improved laying apparatus is of great assistance. At present, the governing principle is to utilize the artillery fire power to the utmost to sweep every spot of the entire field of battle. It is the duty of the officer charged with fire direction to assign combat sections in such a way as to ensure the attainment of the maximum fire effect. It is desirable not to begin the artillery combat until the infantry is about to advance, so as to keep the enemy in the dark as long as possible. But this design will have to be abandoned when the advance guard requires artillery support in order to fulfill its mission, or when an attempt is to be made to force the enemy's hand by means of artillery fire.

An attempt should be made to bring all the artillery of the main body into action at once. But cases may arise in which the commander will unhesitatingly send into action the successively arriving artillery units, in order to secure an advantage gained by the advance guard or to reap the fruits of such an advantage. No commander will voluntarily dispense with the assistance of his heavy artillery, especially when he desires to make his field artillery available for carrying through the fire fight. The most important target of the heavy artillery is the hostile artillery, which will frequently take up unmasked positions so as to get the maximum effect against moving infantry targets. (Par. 426, German H. A. D. R.). Observation is a preliminary condition, and the commander of the troops and the commander of the artillery must coöperate to the end that favorable observation

stations will not be occupied with a fractional part of the field artillery.

"Since information in regard to the enemy's situation and the terrain is indispensable to the decisions of the commander, it is obvious that favorable observation points will play a prominent part. That these observation points will exert a powerful attraction on the hostile fire for these very same reasons should always be borne in mind, especially by heavy artillery. Accordingly, the observation stations of the latter should be selected with this in mind, and, if time admits, protected. In a great many cases, an observation station not located in the best and, consequently, most conspicuous locality, may, therefore, be just as useful."

In a rencontre, the commander will frequently decide to concentrate his force under cover of the advance guard, which has been reinforced by the artillery, to let the enemy advance, and then to bring about the decision by launching all his retained forces in one body. The defensive rôle thus forced upon the commander generally lacks the advantages that would otherwise accrue from deliberately choosing and strengthening a position.

During the fluctuations from offensive to defensive and back again, a frontal fire fight ensues, in which the last fresh forces turn the scale. Compared with the deliber tely planned attack, the rencontre presents greater difficulties to the commander, while it is easier for the troops.

"If the enemy has gained a start over us in preparedness for action, prudence is advisable. The commander will then avoid a serious fight until an adequate force of artillery is available." (Par. 482, German F. A. D. R.). In actual war, the commander and the infantry will perceive that the enemy has gained this start in deployment for action, only when superior hostile fire apprises them of the fact. Hence, this theoretically correct evasion of a fight, is confined to a few exceptional cases. If it does occur, infantry that suddenly finds itself in a critical situation is justly entitled to

demand support from artillery. Batteries provided with shields can be silenced in a short time by curved fire only. Moreover, modern guns are capable, up to a certain point, of compensating an inferiority of numbers by an increased rate of fire.

### 3. THE ATTACK ON AN ENEMY DEPLOYED FOR DEFENSE.

An enemy who does not attack, renounces the initiative for the time being and permits his opponent to reconnoiter at leisure, to make his dispositions, and to coördinate the advance of his infantry with the action of his artillery. In difficult country, the attacker is at liberty to postpone his advance until nightfall. One is, therefore, justified to a certain extent in speaking of a "*planned attack.*" Portable intrenching tools enable troops quickly to construct cover that considerably increases their power of resistance. It is important for the commander of the troops and the commander of the artillery to decide whether the enemy really intends to stand on the defensive, so as to use the ground to the best advantage and to let us attack, or whether he simply desires to make us believe—as the French propose to do—that he will stand on the defensive, only to fall upon us later, better prepared for action than we are.

A numerical superiority in guns makes it easier to gain the victory. This superiority is obtained by launching more units (infantry divisions) than the enemy, and by bringing up the artillery of organizations that are held in reserve for the time being. The concentric attack enables the assailant to bring more guns into action than the defender. The effect produced by the assailant's guns will be enhanced, moreover, when the defender's artillery is confined to a small area.

An accurate knowledge of the hostile position upon which to base measures for the attack, can not be gained

by cavalry reconnaissance alone. Masked batteries can be recognized only under favorable conditions. Smokeless powder enables the defender to keep his dispositions hidden from hostile view. As a rule, it will be necessary to launch infantry in order to obtain the information required as a basis for the decision, to determine the extent of the hostile position and to recognize any advanced posts to which artillery may perhaps have been attached. The best plan would be to entice the enemy to open fire,* and to cause him to make movements that would enable us to draw conclusions as to the manner of occupation of his position.† The reconnaissance from a distance is replaced by forced reconnaissance by fire. In this, the area in which the hostile artillery is presumably located is swept by decoy batteries in order to induce a reply, or the hostile infantry position is taken under fire. The surest way to force the enemy to occupy his position and to disclose his artillery, is to push forward one's infantry. While the purpose of reconnaissance may be served by surprising the enemy with artillery, the commander is not justified in bringing artillery into action at decisive ranges except when immediate advantage is taken of the results achieved.

In this connection it is interesting to examine how the combat was initiated at **Weiszenburg,** at **Vionville,** at **Vernéville** (August 18th, 1870) and at **Beaumont.** In all these cases, the hostile artillery fire proved to be the best means of alarming the troops that were surprised.‡

To launch the bulk of the force prematurely, before the necessary information in regard to the hostile main position

*At Wörth, on the morning of August 6th, 1870, a battery attached to Prussian reconnoitering troops, opened fire at 2,500—3,200 m. and induced a French mitrailleuse battery and a light battery to reply, while a number of other hostile batteries and hostile infantry showed themselves without, however, coming into action. The object of the reconnaissance had thus been gained.

†At the battle of Spicheren, August 6th, 1870, a strong show of artillery on Winter and Galgen Hills would, in all likelihood, have demonstrated shortly that we had to deal not with a retreating enemy but with one in position.

The bombardment of the Boer positions at Magersfontein and at Colenso, on the other hand, did not, in the least, affect the Boer measures, as the English artillery was kept far in rear and the infantry did not advance to effective range.

‡*Taktik*, V, p. 190.

has been gained, can have nothing but a harmful effect. Before the batteries of the main body are sent into action, data must be obtained in regard to combat sections and front to be attacked. The reconnaissance develops of itself into the preparatory stage of the action, in which the artilleyr bombards the hostile positions recognized as advanced posts, in order to enable the infantry to capture them. To this may be added, the task of diverting the hostile fire from columns that are in the act of concentrating. This task usually requires further reinforcement of the artillery. In any event, artillery must do its utmost to draw the hostile artillery fire upon itself. By doing this, the artillery will give the infantry the necessary protection and support for the advance. So long as the attacking infantry is defenseless at the mercy of hostile artillery fire, the assailant's artillery must endeavor at least to keep the defender's artillery from firing undisturbed. The greater the effect of the hostile artillery fire on the attacker's infantry and the stronger the cover of the defender's infantry, the more insistently will the attacker demand artillery support for his infantry. From this it follows that the defender's artillery will likewise have to do its utmost to prevent the batteries of the assailant from developing their full fire power against the defender's infantry. The action of the opposing artillery forces of throwing themselves into the breach for their infantry, explains the existence of the artillery combat that initiates a battle. As the infantry fight progresses, the artillery commander should designate some parts of the artillery to direct their fire upon the hostile infantry. (Par. 469, German F. A. D. R.). The French divide their artillery into groups from the outset, according to the task each is to perform. In the various battles of the Franco-German war, the German artillery succeeded in thoroughly defeating the French artillery after short resistance. Accordingly, the German artillery was able to do pretty much as it pleased. The theory of the artillery duel, of the separation of artil-

lery and infantry preparation of an attack is based upon the experience of the Franco-German war. This theory proved no longer tenable even during the campaign of 1877–78, and during the Boer war (at Colenso, Magersfontein, and Paardeberg). The positions supposedly held by the enemy were for days deluged by the fire of numerous guns, and when the infantry finally attacked, the enemy's artillery and infantry were almost as strong as ever and repulsed the attack.* The theory of the artillery duel is still less tenable to-day, when guns equipped with shields can not be silenced by flat trajectory guns alone. It is idle therefore to talk of the "silence of death reigning" on the side of the vanquished. It is the purpose of artillery fire to cripple the hostile artillery, to "nail" it down to its positions, to prevent it from changing position, and to interfere with its ammunition supply service.

The artillery commander should take his measures with a view to opening fire as suddenly as possible with the bulk of his batteries. (Par. 486, German F. A. D. R.). For this reason, the orders for reconnaissance of the enemy and of the terrain by artillery leaders, and those for bringing up the artillery, should be issued as early as possible. When the situation does not require that the batteries go immediately into action, they remain posted in readiness. The attacker should take care that he does not lose the advantage that simultaneous and sudden action of his artillery gives him. The orders should either indicate when the artillery is to come into action, or specify that all artillery units govern their conduct, as regards time, by that of a designated unit, usually a regiment. When large forces and diversified terrain are considered, it is, of course, not to be expected that all of the batteries will be able to go into position at the same time and to open up simultaneously. But with careful reconnaissance work and judicious distribution of combat

*The last artillery duel occurred on the Yalu. At Liaoyang, on August 30th, 1904, the Japanese artillery bombarded the Russian artillery for sixteen hours without producing any result.

sections and objectives, discrepancies in time will be proportionately small.

During the **Franco-German war** the inefficiency of the French batteries enabled the Germans to mass their artillery little by little, a weak artillery force being able to hold its own against superior numbers. The 4th Light Battery, 12th German F. A., moved through Lacretelle (battle of **Sedan**), and at a range of 1,350 m. held its own against the fire of six French batteries.*

The longer the range† at which the fight is initiated, the more impenetrable will be the veil that hides the dispositions of the enemy, and the more must the advantage of the preparedness for action of the defender's artillery come into play. Difficulties of observation are felt most on the attacker's side and impart to long range fire more the character of a containing cannonade.

During the artillery combat, the artillery of the attack should not come to such close range as to give the artillery of the defense too great an advantage. The necessity of obtaining an adequate effect against the well masked hostile artillery, whose position is usually difficult to recognize, determines the range beyond which it is not profitable for artillery to fire. At ranges over 4,000 m., one can count upon crippling the hostile artillery under favorable conditions only, and by expending a large amount of ammunition. But the fire of a superior number of guns should be able, in any case, to counterbalance the preparations made by the defender. The advantages possessed by the defender dwindle as the range decreases, and are compensated by the attacker's superior number of guns. With modern matériel and means for observation, the first position of the attacking artillery might, therefore, be located anywhere from 3,000 to 4,000 m. from the enemy.

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*HOFFBAUER, *Deutsche Artillerie*, VIII, pp. 28 and 38.

†See p. 340, *supra*.

At the battle of Gravelotte, the frontage of army corps varied from 2.5 to 4 km. In rencontre fights, the frontage was greater, the IIId Army Corps at Vionville, for example, covering a front of 4.5 km. The twenty-four batteries of an army corps at present cover a front of 2,500 m. At the battle of Gravelotte, August 18th, 1870, some of the batteries of the IId Army Corps were unable to come into action on account of lack of room, and others moved their guns into the small intervals between the guns of the artillery of the VIIth Army Corps. In the latter corps, likewise, three batteries (the 3d and 4th Light and the 3d Horse) were held back in rear of the village of Gravelotte on account of lack of room.* On the east front at Sedan, the problem of finding room for the artillery was much more difficult. Of the artillery of the four army corps (Guard, IVth, and XIIth, and Ist Bavarian Army Corps) engaged there, nineteen batteries were unable to go into action for want of room.†

If the army corps had had as much artillery at that time as they have at present, 51 batteries, i. e., more than half of the entire artillery, would have found no room for coming into action. But, on the other hand, more force was employed than was necessary.

*For the passage of Infantry through Artillery Lines*, see *Tactics*, I, Krueger's translation, p. 316.

For *Changes of position*, see p. 364, *supra*.

"As soon as the commander of the artillery has been informed by the commander of the troops against what point the decisive attack is to be made, or in case he himself perceives this, an overwhelming fire, if practicable, from flanking positions, should be concentrated against it. Then and not later, any artillery units that may have been retained, should be brought into action." (Par. 47, German F. A. D. R.). An artillery unit will find it difficult to adjust its fire upon a point that is already being fired upon by other

*Geschichte des Feldartillerieregiments Nr. 7, p. 248.

†Kunz, *Kriegsgeschichtliche Beispiele*, 6, p. 7.

artillery units. Pauses in the firing will frequently have to be made and utilized for this purpose.

"While the infantry gradually draws within assaulting distance of the enemy, the fire of the attacker's artillery must continuously contribute to shake the defender's infantry. The batteries that can be spared from this duty should keep down the fire of the hostile artillery that is firing against the attacking infantry. If new hostile batteries, or others that have been silenced but come again into action, turn against the attacking artillery, the latter should combat them only to the extent that it can do so without diminishing the support afforded its infantry * * " (Par. 471, German F. A. D. R.).

General LANGLOIS estimates that the preparation of an infantry attack against the objectives mentioned will require the following number of rounds of shrapnel per meter of front attacked:

| | | | |
|---|---|---|---|
| Shelter trenches | 3 —4 | rounds of shrapnel | (*obus à mitraille* (90 mm.) |
| Edge of village | 2½—3 | " | " |
| Edge of woods | 2 —2½ | " | " |
| Uncovered position | 1 —1½ | " | " |

The heavy field artillery should direct its fire against hostile batteries that are recognizable and that are also being combated by the field artillery. Hostile batteries that are able to bring effective fire to bear on the attacking troops should by all means be rendered harmless. As soon as this has been accomplished, the heavy batteries should direct their fire upon that part of the hostile position which has been designated as the point of attack. The principal task of heavy artillery consists of making the field artillery available as quickly as possible for combating the hostile infantry. The more batteries we succeed in relieving from the artillery combat and turning against the point of attack, the better.

A clear conception of the situation is requisite to enable one to decide at the very start, how many batteries will be required to keep down the defender's artillery, so that prompt

success may be assured, as more batteries than are absolutely essential to perform the first task must not be withdrawn from the second and most important task, that of firing on the point of attack. It is an advantage when the point of attack can be bombarded from a commanding or, if practicable, flanking position, since a change of position will then be unnecessary so long as the conditions necessary for certain fire control make it possible to distinguish friend from foe, and there is no danger of the fire endangering one's own troops. As soon as the attacking troops get close to the hostile position, the artillery should likewise sweep the ground in rear of it, in order to make it more difficult for the enemy to bring up his reserves. *Judicious distribution of duties* between various artillery units in action is one of the most important tasks of the higher artillery commanders. It requires that the latter possess full information of the intentions of the commander of the troops and that they correctly estimate the tactical situation.

The commander of the artillery will finally have to designate a part of his force for the duty of keeping down the hostile artillery. The unit designated should, if necessary, develop its full fire power for the purpose, or remain in readiness for combating newly appearing hostile batteries. The bulk of the field and heavy artillery should be used for directly preparing the infantry attack.

The crises that occur in every battle are best overcome by boldly launching the artillery into action. It may therefore even be advisable for single batteries or even single platoons to advance to the closest effective range for the purpose of *accompanying the infantry attack.** It is immaterial whether the artillery fires at 2,000 or at 1,000 m. as there is virtually no difference in its fire effect at the two ranges.

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*Examples: Kunz, *Kriegsgeschichtliche Beispiele*, 7.—*Weiszenburg:* 1st and 2d Light Batteries, and 3d Heavy Battery 5th F. A. Kunz, *ibid.*, p. 4.—Balck, Wörth.—Kunz, *ibid.*, p. 9 (this is very instructive).—*Colombey:* 5th Heavy Battery 7th F. A.—Kunz, *ibid.*, p. 10. The artillery of the 1st Division at *Bellecroix*, p. 11. Prussian batteries going into position at *St. Hubert* (August 18th, 1870), Kunz, *ibid.*, p 23.

If the batteries remain at long ranges, they are apt to lose touch with the advancing infantry, in consequence of which they will be endangered more than would otherwise be the case, and will come too late to occupy a captured position. The batteries that follow the infantry constitute supporting points in case of a reverse. They will be able to arrive in the captured position close upon the heels of the victorious infantry and will secure the position. It is scarcely to be expected that artillery fire from a position far in rear will repel an offensive return made simultaneously and energetically all along the line after the taking of the position, when it is remembered that observation of this fire is made very difficult, especially in close country, because friendly troops are closely engaged with the enemy. Artillery that is 3,000 m. away from the hostile position and does not limber up until the moment the assault begins, throws upon its infantry the entire burden imposed by this situation. Retiring infantry will usually not find the support necessary to enable it to face again to the front until it reaches its own line of guns. The moral effect produced on the infantry by artillery that follows upon its heels should not be underestimated. "What matters it, if the battery is disabled temporarily, so long as the thunder and lightning of its guns close at hand electrifies the infantry to charge or induces it to hold the position. After the victory is won, the battery will again come to life, for its guns still remain intact. But, if the sacrifice was made in vain, the artillery that remained till the last will have covered the retreat of its infantry. After such a brave fight, its capture, though a bitter loss, will be a glorious end."

The demand that artillery accompany the infantry attack, is based principally on the lessons of the Franco-German war. It dates from the time when artillery fire superiority was looked upon as a condition precedent to the success of any attack, and when the attacking artillery, after fulfilling this task, could take any liberties it pleased.

The French count strongly upon their accompanying batteries (*batteries d'accompagnement*), but their employment is practicable only when the terrain permits an advance. Even in the Russo-Japanese war, the artillery refrained from accompanying the infantry attack when the ground was open, because such an operation was bound to lead to useless losses. Mountain and machine guns endeavored to perform the duty that had formerly been assigned to field batteries, and such guns are able to occupy positions that artillery can not reach. This is still more true since gun shields have been introduced. A few effective guns of the defender's artillery are at present capable of crippling whole advancing batteries.*

It is impossible to state specifically how closely these batteries should approach the enemy, as this will depend largely upon the character of the ground. On level ground, the batteries should advance to within about 1,000 m. of the hostile position. At ranges under 1,000 m., firing over the heads of the infantry is attended with some risk. The new artillery position should be reconnoitered beforehand—just as is done in any other change of position—with special reference to the position of friendly infantry.† When this is not done, especially when the batteries accompany the infantry across a valley, they may run upon the hostile position without being able to find a field of fire, or may hamper their own infantry.

As each change of position interrupts the firing, and as the hostile artillery must not be given an opportunity to open effective fire, more batteries than are absolutely necessary for the purpose, should not be brought forward to accompany the infantry. Batteries that occupy the poorest positions, and batteries that still have adequate teams are first considered in connection with this duty.

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*See the essay of General Richter in *Artilleristische Monatshefte*, IX, 1907, p. 249. The author suggests that guns mounted on automobiles accompany the infantry.

†Advance of the artillery of the 1st Infantry Division across the valley of the Vallières brook near la Planchette (battle of Colombey). The batteries unlimbered when 300 m. in rear of their infantry, and successfully fought hostile skirmishers at ranges varying from 900 to 1,000 paces. Hoffbauer, *Deutsche Artillerie*, III, p. 31.

At Elsaszhausen (battle of **Wörth**), the victorious German infantry was attacked by fresh French troops and thrown back. The French attack was finally stopped by the fire of three batteries of the XIth Army Corps, and the gallant forward movement was succeeded by wild flight.

At **Vionville,** batteries of the Xth Army Corps—Lancelle's (2d) Heavy Battery, Richard's (6th) Light Battery, and Berendt's (5th) Light Battery—covered the retreat of Wedell's Brigade after its attack had been repulsed by the French. The batteries lost heavily. Berendt's Battery did not withdraw until the last of the infantry came abreast of it, and then the only thing that enabled it to limber up at all was the charge made by the 1st Escadron of Dragoons of the Guard.

When the infantry attack has failed, the artillery, especially that which is farthest advanced, must cover the withdrawal of the infantry. The latter usually halts when it reaches these advanced batteries.

It is only when the infantry rushes forward to the assault that the artillery can think of changing position, for then the defender's guns have more important work to do than to pay attention to a few advancing batteries. But available cover should be utilized anyhow, because the ground in rear of th eadvancing infantry is endangered by hostile shots.

While burst of fire and advance alternate, the infantry worms itelf closer and closer to the enemy's position. When the ground is level and time fire is used, artillery can, at all events, furnish this support until the infantry gets within 300 m. of the enemy's position, and when percussion fire is used, until the infantry gets within about 150 m. of the enemy's position. But then, at the most critical moment, the support rendered by the artillery ceases; it can only direct its fire upon the ground in rear of the hostile position and interfere with the movement of hostile reserves, and the infantry has to bear the brunt of the action. In the opening fights of the Boer War, the advancing infantry was supported by the fire of its artillery until it approached to within 300 or 400 m. of the enemy, when that fire was discontinued. As a result, the attacks failed. Much is at stake, and the infantry must expect to have a few short shots burst in its ranks. (See p. 343, *supra*).

In preparing the assault, it may be a good plan after the hostile position has been vigorously bombarded, and provided both arms are working in complete harmony, to shift the fire occasionally to the ground in rear of the hostile position, to let the enemy resume his fire, and then to batter him again with fire. In case the assault succeeds, all the artillery that is still able to move, should quickly hurry into the captured position.

"As soon as the infantry has penetrated into the position, part of the batteries should hurry forward into the captured position to assist the infantry in holding it. In such a case, the artillery should execute the change of position independently. The remaining batteries should continue to fire on the retreating enemy. If he gets out of effective range, they should move after him at a rapid gait, should deluge him with fire and should prevent him from halting and reforming. At this moment, when all the troops press forward to the captured position and all energies must be bent upon robbing the enemy of the last remnant of resistance, every consideration of distribution and maintaining units intact is forced into the background." (Par. 473, German F. A. D. R.).

The artillery will find clearly visible targets only by moving into the captured position. The thunder of its guns coming directly out of the hostile lines will not fail to produce an effect on the troops that are still struggling. The batteries that have advanced into the hostile position will therefore have to protect the infantry as it reforms, repel offensive returns, and engage hostile batteries that attempt to interfere with the occupation of the captured position. While the fight continued to rage within the village of St. Privat, a tremendous mass of artillery was being formed on the heights south-west and north-east of that village. It is not difficult to imagine what the course of the battle at this point would have been if Picard's Grenadier Division (French) had arrived on the scene in time and had taken a hand in the fight. During the battle of Wörth, such an offensive return was actually made at Elsaszhausen by the French, and a German battery was involved in the resulting retrograde movement, but the French advance was shattered

by the fire of the other German batteries.* The French contemplate making such offensive returns even to-day. In such a critical situation, they reason, something must be risked. In case the attack fails, it is, above all else, essential to impart to the infantry the necessary stamina to face again to the front, and to beat back the hostile pursuit.

Victory is followed by the pursuit, in which the artillery, owing to its latent power, is able to do particularly effective work. In pursuit, every available gun must be employed at the most effective range. While a part of the artillery still deluges the enemy with a hail of fire, the remainder, in conjunction with the pursuing infantry or cavalry, must push after the enemy and open fire at once when the artillery that remained behind loses sight of the targets. In this way the enemy is prevented from making a stand and from reforming his troops, and his defeat may be converted into rout.† The conduct of a vigorous pursuit requires all the energy of which the leaders are possessed. At such a time, they must demand the impossible almost, and should not shrink from treating their troops with severity. Artillery commanders should not await orders for changing position. They should anticipate the orders of the commanders of the troops, for the latter will usually not give orders other than to advance, and an order to halt will always arrive soon enough. It will often be a good plan to fire on the most distant hostile troops, as these will be most easily thrown into confusion.‡ It will frequently be impracticable

*BALCK–KUNZ, *Schlacht von Wörth*, p. 130.

†CLAUSEWITZ, *On War*, IV, Chapter 12: "Nothing makes a worse impression on a soldier, than for the thunder of the hostile guns to become audible again at the very moment when he is about to compose himself to rest after a hard march. When this is repeated for some time, day after day, it may produce a panic. This is invariably an admission that one is forced to obey the dictates of the enemy and is incapable of offering resistance: this consciousness is bound to undermine the morale of the army."

‡*Japanese Regulations:* "After an action that has been fought to a successful conclusion, the artillery should pursue the enemy with fire, which should be discontinued in case of absolute necessity only. An attempt should be made to fire first upon the head of the retreating hostile columns, so that the other parts of these columns may be damaged as soon as they enter the zone of fire. In pursuit, it is frequently within the province even of battery commanders, to order any change of position that may become necessary. Enfilading fire may produce a decisive effect. But care should always be exercised to prevent running out of ammunition."

to keep organizations intact. It will likewise be no longer possible to issue orders to each unit for changing position. To advance rapidly is the only mandate. Flanking fire is especially effective. Horse artillery operating with cavalry is particularly adapted for exerting a pressure on the line of retreat of the enemy. There is no time for careful reconnaissance and for taking up covered positions; a bold advance even beyond the infantry line is in order. All this changes as soon as the enemy takes up a rallying position. The pursuit then again resolves itself into an attack. To be sure, one will not have to proceed as cautiously as when confronted by a fresh opponent, and one can confidently expect that the enemy will not hold his ground very long as a rule. But if, on this account, one were entirely to disregard proper caution, one might experience an unpleasant reverse.

During a pursuit, it is of the utmost importance that ammunition be brought up, in order that the artillery may not find itself in the anomalous position of being on hand but unable to fire. In a pursuit on a large scale, the higher artillery commanders should give this matter their special attention.

## 4. THE EMPLOYMENT OF ARTILLERY IN THE ATTACK ON FORTIFIED POSITIONS.*

A fortified field position consists of shelter trenches of low relief, cut deep enough to afford protection to the occupants against artillery fire when they themselves are not

*Pars. 488–500, *German F. A. D. R.* and pars. 440–460, *German H. A. D. R.* Cf. *Taktik*, V. p. 237 and historical résumé of the views entertained in regard to the employment of artillery against fortified positions, p. 248.—General von HOFFBAUER, German Artillery, *Zur Verwendung der Haubitzen im Feld und Positionskriege*, Berlin, 1901.—Captain KRISAK, *Angriff auf befestigte Feldstellungen*, Berlin, 1901. (This contains complete solution of a map problem).—Major MEYER, *Artilleristische Erkundung (einer befestigten Feldstellung für den Zweck der Fuszartillerie)*, Berlin, 1901.—Lieutenant-General ROHNE, *Die Mitwirkung der Artillerie beim Angriff auf eine befestigte Feldstellung*, Supplement 6 and 7 to *Militär-Wochenblatt*, 1901. (This contains a theoretical discussion and a map problem).—Colonel von GIZYCKI, *Der Kampf um befestigte Feldstellungen*, 1901. (Problem and initiation of the attack). Major HOPPENSTEDT, *Der Kampf um befestigte Feldstellungen*, Berlin, 1905.

firing, and permitting of easy lateral communication. Splinter-proofs may be constructed when additional protection is desired. These afford protection against the shells of flat trajectory guns and against the shrapnel of curved fire guns of medium caliber. To the foregoing shelter for the firing line should be added cover trenches for the supports, breastworks and expedients for the comfort of the troops when the position is occupied for any length of time. To the latter category belong latrines, cooking pits, dressing stations, wind shields constructed of shelter tents, etc., etc. It is likewise desirable to construct obstacles that force the enemy to employ pioneers to clear the ground before he can assault. Similar preparations are made for protecting the artillery. Under favorable conditions, defenses against which the fire of flat trajectory guns will be powerless can be constructed by an infantry division in about eight hours. This means that a fortified field position has been created, in the attack of which the assailant requires the vigorous coöperation of heavy guns to annihilate the hostile artillery and to batter the point of attack. When such a position is, in addition, provided with obstacles, it can not be taken by assault without the aid of pioneers. The characteristic features of such a position are its strength in front, the inconspicuousness of all its works, and its security against direct fire, but on the other hand, the weakness of its flanks and the sensitiveness of its rearward communications owing to the meagre mobility of the defenders. It would be a mistake, however, to attack every position strengthened by shelter trenches as one would attack a fortified field position. This would be necessary only when the defensive works are provided with obstacles, splinter-proofs, and cover trenches and afford complete protection to the defenders when they are resting. A defender attacked with inadequate forces, may perhaps not have strengthened his position in this manner until he has learned the necessity therefor while repelling the attack. This was true at Plevna, on the north-west

front at Port Arthur, and at 203 Meter Hill. The assailant will rarely, at the very start, know of the presence of such a position, and it is to the defender's interest to prevent the hostile reconnaissance, to make the works inconspicuous by throwing up low parapets only, and to mislead the assailant by constructing dummy intrenchments and masks. The order for the attack on the position recognized as the main position, will then have to be based upon and delevop from the failure of the troops initiating the fight.

"There is considerable difference in the strength of fortified field positions, depending upon whether they have been fortified superficially, or whether several days have been spent in strengthening them with all the means available. The attack of such positions will differ accordingly. It will frequently be impossible to approach the hostile position except under cover of darkness. Large combats of position may last several days." (Pars. 440 and 441, German H. A. D. R.). The stronger the position, the more extensive the preparations, and the more protracted the fight, which in many cases will last a number of days.

The attack should seek to bring such a concentric fire to bear on the part of the hostile position designated as the point to be attacked, that the advantage accruing to the defense through preparation of a selected battlefield will be neutralized. The sooner the assailant gains his object, the better. But when opposed by an energetic defender, nothing will be left to the attacker but to utilize darkness for his advance, and daylight for battering the enemy. The plan of attack is based upon extensive reconnaissance that each arm makes according to its particular needs. Success is assured only by a planned, detailed reconnaissance whose results are arranged and classified at headquarters. But the defender will not without a fight permit the attacker to reconnoiter, and the latter will be compelled to employ a strong force in order to gain favorable observation points. (Pars. 406 and 373, German I. D. R.).* As hostile advance troops

*See Balck, *Nachtgefechte und Nachtübungen*, Berlin, 1910.

will oppose this reconnaissance and as it will be difficult, even with the best glasses, to find the works of the defender, an idea of the situation will be gained gradually only. When the hostile position is extensive, it will be a good plan to divide the ground occupied by the enemy into sections for the purpose of reconnaissance.

It is, in the first place, important to ascertain by balloon reconnaissance, or under cover of cavalry that is pushed forward, the extent of the position, the location of its flanks, and whether they rest on impassable obstacles, and to determine whether the enemy is holding the foreground with advanced troops or is confining himself to his prepared positions. Important conclusions may be drawn from the fact that the enemy is observed to be intrenching or collecting troops in rear of his position. The hostile fire sets a limit to the reconnaissance work of cavalry and artillery patrols toward the front. But the defender will, likewise, endeavor to prevent the patrols of the assailant from ascertaining where the flanks of the position rest and by the fire of small infantry detachments force the troopers of the assailant to make more and more extensive turning movements. Nevertheless, information must be gained either by dismounting troopers and letting them gain good points of observation on foot, or by force with the carbine or the lance. If the cavalry does not succeed in solving this problem, nothing remains but to resort to a forced reconnaissance with infantry and artillery. The defender could not commit a greater blunder than to reply to this artillery fire, which can have no other object than that of reconnaissance, unless he desires to draw the attention of the assailant to points at which a serious defense is not contemplated. In most cases, accurate information in regard to the strength with which the position is held and the disposition of the defender's artillery, will not be gained until the attack is initiated, until the infantry advances, forces back the covering troops and captures advanced positions. The defender will,

however, frequently let his artillery fire from positions that are not to be occupied at all during the real defense. The desire to keep the artillery out of action until the situation is cleared up is not always capable of fulfillment, for field and heavy artillery will often have to be sent into action for the very purpose of clearing it up, and to break down resistance offered by the enemy in villages.

The reconnaissance is to determine above all else, the location of the hostile main position, to identify masks and dummy intrenchments, and to ascertain the position of machine guns and searchlights. According to the Firing Regulations for Heavy Artillery (pars. 78 and 84), the artillery reconnaissance is to determine—

"The type and extent of the hostile artillery position—whether the artillery is posted in rear of a crest (distance in rear) or in the open, in echelon or in line; the position of obstacles, other troops, reserves, higher staffs, signal and telegraph stations, and machine guns; movements of any kind; the location and extent of shelter trenches and other field works and the presence of overhead cover and obstacles; the character of the terrain in the vicinity of the targets; balloons and balloon ascension stations. It is important to identify masks and dummy intrenchments. In all cases, it must be specified what parts of the targets it is most important to combat, and what parts are most favorable for the purposes of observation.

"Properly fortified positions appear as fine lines that closely follow the contour of the ground. Conclusions as to the location and extent of such positions may be drawn from breaks in the continuity of color or regularity of the ground, movements in the trenches or in any visible communicating ways. Shelter trenches are frequently not made out until their parapets are manned, and masks and dummy works are generally not perceptible until this occurs. It is difficult and sometimes impossible to recognize splinter-proofs. But it is always safe to assume that overhead cover was pro-

vided, if the defender has had any time at all to prepare his position for defense. Observation loopholes, gaps in the hostile line, and slight mounds overtopping the rest of the work may indicate the presence of such cover. Wire entanglements in plain view often facilitate the finding of shelter trenches and their subsidiary works.

"The most difficult task consists of finding the curved fire batteries of the enemy and such of his flat trajectory batteries as are not to cover the immediate foreground of the position with their fire. In many cases, their position can be approximately fixed by conjecture only. The other batteries likewise seldom reveal any of the cover constructed for their protection, and can be located only when they are firing and by the movements of single individuals (observers, for example), or by protruding epaulements. This frequently applies also to batteries of field artillery.

"Smoke, dust, and the flashes of the guns, sometimes make it possible to get the direction to a masked artillery position by directing a battery commander's telescope upon them. The range and location of the target may likewise be approximately determined by intersection. Conclusions as to the position of masked batteries may also be drawn from the surroundings of the target, the character of the ground, road communications, location of observation stations, etc. While it is impossible to ascertain the exact position of a masked target, it is perfectly feasible to determine the limits within which it must be located. It may even be advantageous to determine that the target is not located at certain points, in order to reduce to the smallest size the area that will have to be taken under fire. In many cases, information of the location of the target can be gained by means of balloon reconnaissance only."

The reconnaissance initiated according to arms and sections, should be begun as early as possible, and it is therefore a good plan, if one has information of the existence of a fortified position, to bring the observation wagons up to the

advance guard. Sufficient time should be allowed for reconnaissance. The commander of the troops can not decide whether to attack at once, or whether to wait for darkness, until a detailed reconnaissance has furnished him with the basis for a decision. A change of plan occasions loss of time and is usually difficult of execution.

Even when the hostile position is to be approached under cover of darkness, it is advisable to bring at least the heavy artillery into position under cover of advanced infantry while it is still light, and to have it open fire. To concentrate artillery at night requires that special preparations, similar to those of siege operations, be made. Each battery must have accurate information as to the route by means of which it is to reach the position. It is not permissible to move elements of a column of artillery past the other elements. Before the march begins, the various elements should be arranged in column in the order in which they are to be used. Long columns should be divided, and stretches of road swept by hostile fire should be passed either by a piece or a small group at a time, or turned. A disabled carriage should not retard the march of those following. It is a good plan to place auxiliary teams in readiness at difficult places of the road.*

The commander of the artillery of an army corps is charged with the duty of directing the artillery attack. For this purpose he will have at his disposal, if one battalion of heavy artillery be included, 126 flat trajectory guns and 34 curved fire guns, viz.,

21 field batteries, in all 126 guns, with 281 shrapnel and 56 shell per gun;

3 light field howitzer batteries, in all 18 guns, with 223 field howitzer projectiles (model 05) per gun;

4 heavy field howitzer batteries, in all 16 guns, with 422 shell (model 04) per gun.

(Timely requisition should be made for replenishing the ammunition from the depôt.)

*For details, see *Nachtgefechte und Nachtübungen*, pp. 219 and 249.

The order for opening fire (*Feuerbefehl*) is based upon the result of the reconnaissances.

In order for the attack to succeed, superior artillery must be brought into action at the point where the decision is sought. The commander will often be able from the map to decide upon the division into combat sections, and, in case heavy artillery is attached, assign a section to it during the advance or during the development for action. The artillery should be so disposed as to enable it to bring a concentric fire to bear on the principal supporting points of the hostile position. The observation station of the heavy artillery should be selected with especial care and due regard should be had to this in posting the field artillery. By far the most important consideration will be to cripple the hostile artillery.

Frontal and, if practicable, flanking shrapnel fire of field guns should be employed against hostile batteries of field and heavy artillery posted in masked positions, unless the latter are such as to preclude obtaining an effect, and percussion shell fire of howitzers against visible field batteries. (Pars. 426–452, German F. A. D. R.).* This is at this stage so important that curved fire guns are not available for other duties than these. At the same time, field guns attack observation stations, machine guns, and balloons. To employ flat trajectory guns against shelter trenches from which no one is firing and which may not be occupied at all is a pure waste of ammunition, for if no one is firing from such trenches, there is nothing to prevent our infantry from advancing. Besides, even if the trenches are occupied, direct artillery fire does not diturb the occupants in the least. So it is better, in any event, to wait until the hostile parapets are actually occupied by firing skirmishers and then to direct shrapnel fire upon them. Unoccupied trenches, because

*During the battle of Dhomokos, May 17th, 1897, a Turkish 12 cm. howitzer battery firing at 3,000 m., quickly silenced four Greek field batteries, inflicting on the latter a loss of 25% of their personnel. The Turkish howitzers were provided only with common shell and shrapnel. v. d. GOLTZ, *Der Thessalische Krieg*, 1898, p. 193 *Artilleristische Monatshefte*, 1908, p. 205.

they are very apt to be mistaken for other lines, are at best difficult to recognize.

It is especially important to place an adequate supply of ammunition in readiness. This will be simplified by the fact that a change of position need not be considered. The light ammunition columns of the heavy artillery deposit their ammunition at suitable points and then bring up the ammunition of the heavy artillery ammunition columns, which are in the meantime unloaded at designated points.

The artillery of the defense must not allow the hostile infantry to cross unmolested the zone of effective artillery fire—extending from 4,500—1,500 m. If it suffers the hostile infantry to do this, it will have committed an irretrievable blunder, and will have failed to fulfill its principal mission. The advance of the attacking infantry will necessarily cause the defender to move some of his batteries from their masked positions to a position from which their fire will command the immediate foreground. The attacking artillery will now be able to combat successfully the defender's batteries. In order to do this, it is absolutely essential that the assailant's artillery work hand-in-hand with its infantry. A separation of artillery combat and infantry attack is a pure waste of ammunition. (See p. 418, *supra*). If the defender's artillery at once begins the artillery combat, it is absolutely essential that its fire be kept down before one can enable one's infantry to make a lodgment at close range.

When the contending forces are large, especially when the defender's position is strongly fortified and furnished with heavy artillery, it will rarely be feasible for the attacker to open fire simultaneously with all his artillery. In many cases, some of his batteries will not be able to go into position until they can do so under cover of the fire of other batteries. It may likewise be advisable to retain some batteries or battalions in readiness for combating hostile artillery that has not as yet been located, or for creating a sudden diversion.

During the Russo-Japanese war, the most effective way to attack advancing infantry was found to be flanking shrapnel fire from masked batteries located in adjacent combat sections, even when this fire was delivered at long ranges. Such batteries (or even guns or platoons) are very difficult to locate and to hit, and can be crippled only by fire from flanking positions. (See p. 448, *infra*).

But one will not be able to count on completely silencing the defender's artillery. When the latter is unable to continue the fight against the superior artillery of the attacker, this does not necessarily mean that it will not come into action again when the assailant advances to the assault. The assault will succeed only when the attacker manages to silence the defender's artillery permanently and to bring curved fire to bear on his infantry in its splinter-proofs* and cover trenches. In this work,the howitzers are assisted by the shell fire of gun batteries. When the attack consumes several days, the attacker should endeavor to move his field artillery to close range under cover of darkness. But the longer the defender is able to divert the curved fire of his opponent from the infantry position, by means of the fire of batteries posted in masked positions, the more difficult will it be for the attacker's artillery to shake the defender's infantry sufficiently to permit an assault to be made. So long as the attacker's infantry has not as yet approached to close range, and the obstacles in front of the position are still intact, the defender will occupy the position only with small well concealed observation detachments and machine guns, and hold the bulk of his infantry farther in rear in cover trenches. This is prescribed in Russia. The position can not be considered ripe for assault unless it is made impossible

*To produce an effect, a regular bombardment of splinter-proofs requires the expenditure of a good deal of ammunition. If the center of impact lies in the center of a target 4.5 m. wide, 200 rounds of shell may suffice to hit 10 splinter-proofs located within a shelter trench 150 m. long. When the center of impact lies 15 m. short or over, a rather favorable condition, only 4 or 5 hits may be expected from 200 rounds fired. To destroy 7 out of 10 splinter-proofs, would, therefore, require the expenditure of 400 rounds of shell.

for the defender's infantry to stay in these cover trenches.* The closer the attacker approaches the position, the more strongly must it be occupied by the defender.

The task of shaking the defender may be accomplished most quickly by compelling him to expose himself to small arms and shrapnel fire. This object may be attained by directing the fire upon the ground in rear of the position and by discontinuing it temporarily, only to resume it suddenly according to an accurately regulated plan determined upon beforehand. The defender's infantry will frequently line its parapets in the expectation that an attack will be made especially when the attacker, by showing his infantry, gives the impression that the assault is about to begin. The attacker's infantry likewise should not let this opportunity to develop its full fire power escape. The above described method of combat should be regulated all over the battlefield by one person. It may be objected that the defender will be familiar with this scheme and will not leave his cover but will be satisfied to have observation posts observe the ground over which the attack will be made. From a purely theoretical standpoint, this objection is well taken, but the fear that they may occupy their parapets too late, that a negligent observation post may fail to notify them of the impending attack, and the desire to get a breath of fresh air, will, in most cases, induce the defenders to leave their cramped splinter-proofs. In order thoroughly to shake the enemy, however, the fire must be continued during the night. The obstacles are destroyed by infantry and pioneers during lulls in the firing. Artillery projectiles are capable of destroying comparatively insignificant obstacles only. When it becomes necessary to disable search-light plants and machine guns, single guns are brought forward by hand for the purpose, and intrenched.

*The artillery preparation against a Russian field position would seem to be particularly difficult, requiring much time and ammunition on account of the distribution of the targets in depth (extensive obstacles and numerous splinter-proofs, the latter being usually constructed in rear of one another). See sketch in *Taktik*, V, p. 305.

When the assault is imminent, the fire against the point of attack must be so regulated and, during the last stages of the fight, so increased, that the defenders will not dare to raise their heads above their parapets to face the combined infantry, machine gun, and artillery fire of the assailant, and will find security from the latter's curved fire neither in their fire trenches nor under their splinter-proofs.

After the attacker's artillery has repeatedly interrupted its fire for irregular periods for the purpose of causing the defenders to relax their attention, and has deluged them with fire whenever they occupied their parapets, it may be advisable to initiate the assault during one of these lulls. This is especially desirable when the assault is to be made under cover of darkness. But it may likewise be a good plan to launch the assaulting troops from their positions at the same moment (watches being accurately set beforehand), to direct the fire of the artillery upon the ground in rear of the hostile position, at the same instant, and to designate several batteries ot keep down the fire of hostile batteries that come again into action, or to repel counter-attacks made by hostile reserves. In case the attack fails, the defender must again be driven under cover by intense artillery fire, in order that the attacking infantry may be enabled to make a lodgment on the ground it has gained.

## V. THE DEFENSE.*

The attacker seeks to reconnoiter quickly and thoroughly. This is opposed by the defender, who not only tries to prevent the hostile reconnaissance, but also endeavors to gain for himself, as soon as possible, information in regard to the direction of the opponent's attack. Both tasks require the use of small advanced detachments of all arms in the foreground of the position, especially in front of the flanks.† As these detachments are to deceive the enemy and are apt to become seriously involved and to retire too late, if too strong in infantry, the leading rôle must be played by the artillery, which can produce an effect at long range, force the enemy to deploy and to disclose his hand. The assignment of infantry and of machine guns is governed in this case by the amount of protection required by the artillery.

The French favor the employment of advanced detachments of all arms.‡ In these, the difficulty will ever be to withdraw the batteries without making them suffer severe losses. The disadvantages of such advanced detachments become apparent when the attacker advances on a broad front. In judging the merits of such detachments, it is instructive to study the conduct of the artillery of the Austrian IIId and Xth Army Corps in the advanced position on the Bistritz (**Königgrätz**). The two batteries of the IIId Army Corps were quickly silenced by the four batteries of the Prussian 8th Division, which came simultaneously into action, and forced, as were also the infantry supports, to retire. The eleven batteries of the Xth Army Corps, however, inflicted heavy losses on the successively appearing batteries of the 4th Prussian Infantry Division, and were able to reach the main position unmolested.

The failure of Douay's isolated division at **Weiszenburg,** on the other hand, stands in marked contrast to the success of the operations of the German advanced detachments on the **Lisaine.**

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*Pars. 501–514, *German F. A. D. R.*, and pars. 601–619, *German H. A. D. R.*

†See *Taktik*, V. p. 280.

‡*Ibid.*, p. 277.

*The line on which the artillery is to fight the decisive action forms the framework of every defensive position.* The artillery will rarely be able to accomplish all its tasks in a single position. A single, central position will usually be advantageous for a weak artillery force only. Such a position becomes a disadvantage to a strong artillery force, as the hostile guns will have a concentric fire effect upon it. The first position should be selected with a view to enabling the artillery to command the approaches and to force the hostile infantry to deploy. It is likewise important in selecting this position, to consider where the attacking artillery will probably go into position and whether fire can be brought to bear upon it while it is moving into position. An opportunity may, at the same time, offer to draw the attacker onto unfavorable terrain. In the defense of hill positions, the artillery of the defender is usually posted in rear of the crest, but in order to sweep the forward slope of the height when repelling the infantry attack, it will be obliged to leave its masked position and advance farther to the front. This is fatal when the attacking artillery has obtained good adjustment, and it is usually better, therefore, to send the batteries into action at another point. When the batteries can make use of farm buildings or of patches of timber, they will frequently be able to maintain their positions and to bring flanking fire to bear on the forward slope of the height held. (See p. 448, *infra*).

As the defender is pretty much in the dark until the direction of the hostile attack becomes known to him, he is usually unable to designate at the very start where his artillery is to go into position. The artillery must, in consequence, be posted in readiness, in order to avoid being forced to undertake a hasty change of position when the enemy advances. In any event, the artillery should prepare to meet an attack from several directions, and this it will rarely be able to do in a single position. The defender should endeavor to have his heavy howitzer batteries open fire

before the hostile artillery does so. Their target is, in the nature of things, the attacker's artillery. This enables the defender's field artillery to devote itself to combating the advancing hostile infantry and to keeping down the fire of the curved fire batteries of the attacker. Heavy flat trajectory guns, on account of the effectiveness of their shrapnel, should be kept in readiness to fire on the routes leading to the position, and on the flanks to oppose hostile turning movements. Artillery posted in readiness should utilize the time until fire is opened, for carefully examining the position, repairing roads and ascertaining ranges, particularly those to the probable artillery positions of the enemy and to points in the direction in which the hostile infantry attack will, in all likelihood, be made.*

Gun pits, masks, and epaulements should be constructed in adequate numbers to enable the artillery to meet attacks from the directions in which they will probably be made. Frequently it is overlooked that by placing a gun in a pit, the line of sight is lowered and the field of fire in consequence decreased. When time admits, it is advisable to take a look at the position from the front, as its shortcomings will be most clearly apparent from that side. Gun pits with epaulements that can be recognized as such a long way off, are worse than none, as they make it easier for the enemy to observe his shots and therefore facilitate his adjustment. But the artillery commander should not use gun pits simply because they have been dug, for, should the attack come from a direction other than that anticipated, the batteries might be forced to move into position obliquely and with insufficient intervals. The firing position is taken up as soon as the direction of the hostile attack becomes known, if practicable, before the enemy has brought his guns into battery. Covered terrain and ignorance of the enemy's measures, make it difficult to recognize this moment; if the artillery hesitates

*See corps orders issued on January 11th, 1871, for the defense of the Lisaine position. KUNZ, *Entscheidungskämpfe des Generals von Werder*, I, p. 178.

too long, it might have to go into position under the fire of the hostile artillery. If, on the other hand, it goes into position prematurely, it may have to change front or position, perhaps, at a critical moment.

Artillery should, on principle, be protected by infantry that is pushed to the front to prevent hostile skirmishers from taking part in the fight against the defender's artillery. Aside from considerations of terrain, it will be advisable to push the infantry line about 600 m. beyond the position of the batteries, and to keep the troops destined as immediate supports in close proximity. But the terrain exercises a decisive influence on the location of the supports. When the foreground affords adequate cover to supports and reserves, the sheltering features generally restrict the field of fire and impair the effect of the artillery. But when the ground is open and sloping toward the enemy and the infantry reserves have to be kept in rear of the artillery, the infantry will find few favorable conditions for its action. The supports that must be pushed forward to the firing position are obliged to cross terrain devoid of cover, and this disadvantage increases with the distance to the main position. The commander will rarely be able to harmonize the requirements of the two arms, as every compromise is only too apt to work a disadvantage to one of them. But since the infantry must conduct the fight from start to finish in its positions, its wishes should be given the most attention. It is a good plan to keep curved fire batteries in rear until data for their employment have been obtained. In large units, when the situation is not as yet cleared up, it may be advisable to hold out all the artillery as a reserve. This may also be done when a counter-attack on a large scale is contemplated and the commander is not sure that he will be able to withdraw batteries from the fight for this task.

At **Beaune la Rolande,** one infantry brigade and six batteries of the Xth Army Corps were posted at Marcilly as a reserve. When the French envelopment made itself felt on the right flank, four of these batteries went into action to support the right wing.

On the **Lisaine,** the strong reserve that was kept out needed artillery to enable it to carry out an independent mission which would, in all likelihood, have consisted of a counter-attack. On account of the great extent of the position and the absence of roads, it was doubtful whether artillery could have been withdrawn from action, and especially whether it would have arrived in time at another point. It was, therefore, entirely consonant with the requirements of the situation to form the reserve of all arms.

At **Wörth,** the artillery of the French reserve was no longer able to come into action.

At **Gravelotte,** August 18th, 1870, French batteries did, indeed, succeed in coming into action between Moscow and Point du Jour, during a lull in the fight and under cover of dusk, but, at **Vionville,** August 16th, 1870, batteries of the VIth Corps in vain attempted to go into position east of Rezonville.

*With the first shot fired by the defender, the uncertainty of the attacker vanishes.* The commander of the whole force therefore generally reserves to himself the right to direct when fire shall be opened, but in particular cases may delegate this right to the commander of the artillery. No opportunity should be neglected to surprise with fire artillery that is in motion. While the defender is ready for action in his position, the attacker's dispositions are still in progress of developing. Favorable opportunities, such as are presented by unlimbering artillery and by suddenly appearing columns of infantry, pass rapidly. If one were to get the commander's permission by telephone, to open fire in such a situation, one would perhaps invariably come into action too late. It is therefore advisable in such cases to allow greater latitude to artillery of the defense. The duty of keeping at a distance hostile reconnoitering detachments should preferably be entrusted to the advanced infantry alone. To open fire prematurely betrays the position; to open it unexpectedly enhances the effect. Artillery of the defense should fire at distances beyond effective shrapnel range in exceptional cases only.

We say, the defender should force the attacker to deploy as soon as possible. This is eminently correct when the principal object is to gain time. But when a decision is

to be brought about, the first consideration is to inflict damage on the enemy. In this instance, it is proper to open fire at long range in exceptional cases only, for example, against a defile. But it is generally better to let the enemy approach to effective range, for to open fire at long range would be playing into his hands, as he is naturally desirous to draw our fire. If the enemy knows that the position has been occupied and proceeds cautiously, he will perhaps bring artillery into action beyond effective range. This will likewise induce the defender to open long range fire, which will be exceedingly embarrassing to the attacker's artillery, as it will be obliged to change position.

Known ranges can be utilized and the initial superiority of the artillery made permanent only when fire is not opened until the enemy gets within shrapnel range. When practicable, one should avail oneself to the fullest extent of the moral effect produced by the sudden burst of fire of a mass of artillery at effective range on an enemy who is still in route column. When the hostile artillery is decidedly superior numerically, it may be advantageous to dispense entirely with artillery fire, to save it up for repelling the infantry attack, and to remain in readiness in order to deluge with fire carelessly advancing hostile artillery and isolated hostile batteries.

But this will be a bitter pill for the defender, who thereby yields to the attacker's artillery such complete control over the battlefield, that its fire may produce results like those obtained on the target range. These tactics were used in many of the fights waged by the Boers against the British in South Africa.

When batteries provided with shields are posted in a masked position and can change position without being observed by the enemy, they can hold their own even against superior numbers; the danger of their being silenced is very slight. It is only when the hostile artillery is very much stronger numerically and when the terrain does not permit

firing on the hostile artillery, that the batteries, if ordered to do so by the commander of the troops, may withdraw temporarily from the hostile fire, i. e., either move back and remain in readiness, or withdraw their personnel under cover. There will then be opportunities to overwhelm with fire carelessly advancing hostile batteries or to direct fire upon uncovered guns of the attacker.

If the defender takes up the artillery combat, he should use all the artillery force at his disposal; the attacker, who is obliged to bring his forces into action gradually from the route formation, must be combated from the outset by the greatest available superiority. In view of the special advantages that usually assist the attack, the defender's artillery will but rarely be able to count upon winning a decisive victory over the attacker's artillery. The defender will have gained quite a good deal if his artillery and that of the attacker are evenly matched. The more evenly matched the opposing artillery forces, the more easily will the defender be able to withdraw a part of his artillery from action, in order to employ it against threatened enveloping movements or during an offensive movement made by his reserve.

Heavy artillery should, in the first place, join the field artillery in combating those parts of the hostile artillery that are recognizable. Then the heavy artillery should direct its fire against hostile batteries whose fire has become most annoying.

When superior hostile fire forces some parts of the defender's artillery to cease firing temporarily, the other batteries, particularly those of the heavy artillery, should continue their fire, increasing its intensity.

When the infantry of the opponent advances to the attack, the heavy artillery of the defender generally continues to fire without abatement on the artillery of the attacker and thereby makes it easier for its field artillery to combat the hostile infantry. The batteries that accompany the infantry attack likewise afford good targets, as they generally

go into position uncovered. The Austrians contemplate posting single guns or platoons in the infantry position for the purpose of repelling the assault, and unmasking them at the last moment. This is also recommended in England, as it appears preferable to moving guns up by hand. Field artillery will frequently have to leave cover and go into position uncovered, in order to fire upon the attacking infantry without regard to the fire of the hostile artillery. When this happens, gun pits and epaulements are an advantage. Batteries that can not fire upon the hostile infantry, turn against the artillery. It is preferable for the purpose of warding off the assault, to move artillery out of the positions that it occupied during the artillery combat. The enemy will devote his attention to the abandoned positions anyway and, besides, his fire is adjusted upon them. A defense seeking a decision, must be combined with a counter-attack, which, like any other attack, must be supported by artillery fire. Since the hostile counter-batteries will usually go into position uncovered, in order to save time, they offer good targets for the defender's heavy artillery. The problem of disposing artillery for the counter-attack is a difficult one. The English often designate for this duty batteries that, while they participate in repelling the attack, are to keep themselves in readiness to coöperate in a counter-attack and quietly to reconnoiter their position. But it is doubtful whether they will be available at the right time. Since it is not a good plan to hold out an artillery reserve, one will have to wait until batteries are available for supporting the counter-attack.

If the commander decides to await the assault, the batteries remain in their positions. The howitzer batteries continue to fire on the assailant's artillery, especially on the batteries that accompany the assaulting troops. It is better for the artillery to operate from a flank position (for example one resting on a village), than from within the infantry lines, as its activity will not be hampered and its fire will not be

masked in the former case by retiring skirmishers and as the hostile artillery will have difficulty in damaging it. (See p. 453, *infra*). Whenever attacking Japanese infantry was exposed to such fire, its attack failed.

"*During the assault, the artillery should hold on firmly until the last moment. This course will reflect the greatest glory upon the artillery, even if it should lead to the loss of the guns.*" (Par. 514, German F. A. D. R.).* In case the attack succeeds, all the batteries should concentrate their fire upon the assaulting infantry, so as to coöperate with the reserves in driving the enemy out of the position. Batteries that are unable to take part in the fight of the infantry, prevent hostile artillery from advancing into the captured position.

The heavy artillery endeavors, in conjunction with the field artillery, to prevent the enemy from making a lodgment in the captured position. The commander of the troops decides whether this shall be done from the position the artillery occupied during the action or from the rallying position. When there is no longer any chance of using the guns, the situation existing at the moment will decide whether the men should use their rifles or whether the batteries should retire into another position. The distance between batteries and the crest under cover of which they are posted, governs. When posted close up, they can not sweep the immediate foreground and the men must have recourse to their rifles, in the event that the assault extend to the position of the batteries. It is impracticable for the batteries to turn their fire upon a point of attack lying laterally with respect to their position. When the batteries are posted a greater distance in rear of the crest, it is doubtful whether they will be able to distinguish friend from foe well enough in the fluctuating fight, to permit them to fire safely. And even if these heavy

*The heroic stand made by the Austrian artillery at Königgrätz is a model worthy of imitation. In this case, the Austrian artillery left 187 guns in the hands of the enemy, but covered the retreat of its army.

batteries were to succeed in retiring into a new position, they would scarcely have time to take up a masked position, and would, if coming into action in the open, fall an easy prey to the shrapnel fire of the batteries brought up by the victorious enemy. When the battle terminates in the defeat of the defender, his heavy batteries are the first spoils that fall into the hands of the victor.

## VI. THE RETREAT.*

The conditions under which a unit may have to break away from an enemy are so various, depending upon the distance to the enemy and the mobility of one's own artillery that it is impossible to formulate rules that would fit every case. When artillery still has an adequate amount of ammunition and a sufficient number of teams, it is particularly suited to stem the pursuit of the enemy and to enable the other arms to reform. In conjunction with cavalry that has been left in rear, the artillery then forms the screen under cover of which the infantry reforms in route formation. If the guns are lost in the effort to facilitate the retreat of the other arms, in the attempt to avert disaster, such loss can not but redound to the honor of the artillery.

When the artillery can be withdrawn from action in time—at the latest perhaps just before the assault—and into a position in rear, it will most effectively prevent the enemy from spreading out and his batteries from advancing. The artillery must comply with two requirements. The one to reach the rallying position in time, the other, not to deprive the infantry prematurely of support, least of all, at the point where the enemy is pressing most violently and where resistance must be kept up longest. The batteries that have farthest to go are first withdrawn. By doing this, the batteries can take their proper places in the route columns without being delayed. Artillery can be of use in the withdrawal of other troops only if it has reached a rallying position within effective range of the enemy. When the rallying position is too close to the enemy, the artillery will soon be forced to make another change of position; when it is too far away, the retreating troops will be without the support of

*Pars. 518–521, *German F. A. D. R.* and pars. 620–622, *German H. A. D R.*

the artillery, which is withdrawn from them for some time. A distance of 3,000 m. between rallying position and main defensive position would be very appropriate. It is desirable to have the rallying position located so that the fire may be directed from it upon the old defensive position, in which the enemy will undoubtedly linger for some time in order to reform his disordered troops to some extent at least.

The batteries that remain behind will usually find themselves in a very critical situation, and their withdrawal is possible only when covered by the other arms. When this assistance is wanting, the batteries will break down under the pursuing fire of the enemy, and their retreat will be converted into rout. It is always difficult to withdraw the batteries when they are exposed to hostile fire. While artillery units are still within the zone of effective hostile fire, it is imperatively necessary, as a rule, for battalion and battery commanders to remain with their respective commands. The brigade and regimental commanders ride ahead to reconnoiter the new position and battalion commanders despatch experienced officers ahead for a like purpose.

While battery and platoon commanders are doing their utmost to ensure the guns getting off at all, by properly distributing the available horses, by quickly removing from the teams those that are disabled, by detailing uninjured men where severe losses jeopardize the proper execution of orders, by causing repairs to be made so as to save all that can still be saved, and by devising means how best to withdraw the remnants from the fire, the battalion commander has kept in close touch with the tactical situation. He decides whether all the batteries shall withdraw simultaneously or whether some of them shall remain in action to cover the retreat of the remainder, what road shall be followed, and how the battalion shall enter the column. Besides, he must consider from what direction the most imminent danger threatens, take suitable measures to ward it off, and apply to the nearest troops for assistance. The battery commanders

are too completely occupied by affairs in their immediate domains to pay any attention to tactical measures of security. In moving into the rallying position, care should be taken that the enemy's attention be not drawn to the position it is proposed to occupy.

During the subsequent stage of the retreat, the artillery should occupy rallying positions in rear of which the retiring troops can find time and room to reëstablish order in the various units and to form route column. When this is once accomplished, the artillery attached to the rear guard should increase the distance between the retreating columns and the pursuing enemy. Positions in rear of defiles are especially suited for this purpose. It is important that an adequate supply of ammunition be placed in readiness, that routes to the rear be thoroughly reconnoitered and that several parallel routes to the rear be found, so as to facilitate the withdrawal into a new position.

Increased attention should be paid to the flanks, since the most dangerous interference with the retreat threatens from these directions. When suitable flank positions can be found and occupied by the artillery, the retreat can be materially facilitated, as the enemy will be forced to make changes of front that will cause him to lose considerable time.

Particularly profitable tasks await the heavy artillery during a retreat when the hostile artillery shows a disposition to press forward in pursuit. Heavy artillery is preferably assigned to the rear guard for the purpose of delaying the enemy. It is important that it retire by echelons from one rallying position to another, that sufficient ammunition be made available, and that lines of retreat, preferably a separate one for each battery, be reconnoitered. "When heavy artillery undertakes to combat the pursuing infantry, it may be quickly overcome or overtaken on a flank by the latter and lose its mobility in consequence. Besides, it would have to engage the infantry principally from unmasked positions, which, as the guns have no shields, would be more

or less of a useless sacrifice. Heavy artillery can not consider taking up unmasked positions unless it succeeds in registering its fire on crests before the latter are reached by the hostile artillery or unless such unmasked positions are out of range of the hostile guns.

"It is in rear guard actions more than anywhere else that heavy artillery will find plenty of opportunities for disabling hostile batteries that push forward precipitately or go into action recklessly. By combating them, heavy artillery will render its own field artillery and infantry the greatest service. For the field artillery, relieved of all anxiety in regard to the hostile artillery, can concentrate its fire that much more effectively on the pursuing infantry, and the infantry can break off the action much more easily, since the pursuing infantry—so we learn from military history*—will never, by means of its legs alone, be able to overtake retreating infantry."

Light ammunition columns and combat trains should usually be sent ahead to previously designated points, in order that they may not hamper the batteries during the withdrawal, but battery reserves of field artillery should be sent ahead in exceptional cases only. The battery reserves of heavy artillery, on the other hand, should be sent ahead, and the ammunition deposited near the batteries must be repacked in the caissons.

*FRIEDERICH, p. 65.

# VII. THE EMPLOYMENT OF ARTILLERY ACCORDING TO VARIOUS REGULATIONS.

## AUSTRIA.

**Rencontre.** "When in a recontre, the deployment of the enemy's artillery has progressed farther than one's own, the artillery of the advanced troops must make very skillful use of the ground in order to be able by means of indirect fire on a broad front, to cope effectively with a superior number of hostile guns. In this, it will often be desirable to develop a high rate of fire, in order to induce the enemy to unmask his batteries. When nothing but unmasked positions are available and conditions are unfavorable, advance guard artillery should avoid an artillery combat that is without prospect of success. A better plan would be for the advance guard commander to order it to get under cover, there to await the arrival of the artillery of the main body. But when its own infantry requires decisive assistance, advance guard artillery should unhesitatingly open fire, even if, by so doing, it should suffer severe losses."

When two opposing forces are still in motion toward one another, the batteries attached to the advance guards of the columns, should attempt to surprise the enemy by prompt and vigorous action on a broad front and endeavor to fire on him while he is still in march, cause him to deploy prematurely, hamper his deployment, deceive him as to our own intentions, support the infantry in its advance, or in maintaining the ground it has gained, thereby create favorable conditions for launching the main body and contribute with its fire to clearing up the situation.

**The attack on an enemy in position.** The Austrians are not as yet quite rid of the idea that a superiority of artillery fire must be gained before the infantry attack can be made. The regulations attribute far too much importance to battering the hostile artillery, equipped as all artillery now is with shields. "The attacking artillery should endeavor to gain as quickly as possible a superiority of fire over the hostile artillery, in order that it may be able at the earliest moment to devote itself to its proper task, that of directly supporting its own infantry. It should not lose sight of the importance of combating the concealed hostile batteries and machine guns. Even during the artillery combat, the attacking artillery should always stand ready to assist its own infantry, without regard to the losses that it may expect to suffer at the hands of the hostile artillery. Even at this early stage of the combat, bodies of infantry destined to initiate the attack may materially assist the attacking artillery by firing on the hos-

tile batteries. It will sometimes be practicable, likewise, to detail small bodies of infantry and machine gun batteries for the special purpose of firing at short range on the hostile artillery."

When the hostile artillery is difficult to combat in its masked positions, it will frequently be a good plan to have the infantry advance by echelons, while the batteries that remain behind in readiness for immediate action, open a vigorous fire as soon as the position of the hostile artillery becomes apparent. "When the hostile artillery has been partially or wholly silenced, or when its own infantry begins to advance to take up the decisive fire fight, the majority of the batteries should bring an overwhelming fire, when practicable from flank positions, to bear on the section indicated by the commander of the troops as the one to be attacked, directing their fire preferably against the supporting points, but not neglecting to prevent the advance of hostile reserves, by sweeping the approaches in rear of the hostile position. The more thorough this bombardment, the smaller will be the losses and the more certain the success of attacker's infantry.

"A few batteries should, when necessary, continue the combat against the hostile artillery."

When the hostile artillery has discontinued its fire, this is not necessarily an indication that it has been definitely defeated, and a few batteries posted in readiness for immediate action should, therefore, observe that part of it which is still capable of firing effectively upon the attacking troops, and silence it, when necessary, by vigorous action.

But the greater part of the batteries must unquestionably be used to support the infantry attack. Each battery should be prepared at all times to change target promptly for the purpose of combating hostile counter-attacks directed against a flank of the attacking infantry.

"The most important duties of the higher artillery commander consist of quickly grasping and correctly distributing the tasks falling at this stage of the combat to the lot of the various units, and of making an appropriate disposition of the available ammunition. To perform these duties properly, the artillery commander must be fully informed of the intentions of the commander of the troops and must correctly estimate the situation."

The necessity of keeping up the artillery fire until just before the assault, is not emphasized as forcibly as in the German regulations. "As soon as the artillery finds that it can no longer continue to fire on the point of attack, the batteries that have remained behind in their position, should direct their fire upon hostile reserves and the routes by which they are approaching the defensive position and likewise against hostile artillery that appears for the first time or that reappears in action, always however, remaining in readiness and prepared to combat hostile counter-attacks." In case the attack succeeds, "a part" of the batteries is to hasten forward into the captured position.

"When the action is being broken off, the artillery should gain time for its own troops to effect an orderly retreat. It will usually be advis-

able to assign a part of the artillery to the infantry reserves, and have it take up, when practicable off the line of retreat, a suitable position upon which the advanced troops can rally.

"The flanks must be watched at all times, as the opponent can most effectively operate against the line of retreat from their direction. Flank positions should be used in order to force the enemy to make changes of front that will entail loss of time, and to prevent one's own fire from being masked by the troops that are retiring directly to the rear."

The regulations recommend that, in **pursuit,** single batteries supported by cavalry, be pushed ahead of the infantry.

In **defense,** it is the duty of the artillery to command the ground over which the attacker will have to pass, so as to make it difficult for him to approach the position, and in conjunction with the infantry to bring about the failure of the attack, as well as the success of the counter-attack.

In defense, greater importance is attached to posting the artillery in groups, to concentrating the fire in the various groups, and to using the terrain for the purpose of bringing enfilade fire to bear on the enemy. It is a good plan to detail small units supplied with plenty of ammunition to bring flanking fire to bear and to sweep defiladed spaces in the foreground. In exceptional cases, it may likewise be advisable to employ at important points of the infantry position, single guns (demi-platoons) or platoons, which are uncovered at the very last moment and take part in repelling the infantry attack. But the available artillery must not be split up for this purpose under any circumstances. The regulations do not specify what the distance between infantry and artillery positions is to be. When the ground requires it, a battery commander is not to hesitate to post his battery within, or at any rate, very close to the infantry line.

It is absolutely essential to the solution of the problems that confront it in the course of an action, that the artillery of the defense be employed energetically, and that its ammunition be disposed of correctly as required by the tactical situation. By promptly occupying good positions one after another, especially flank positions, when the ground admits, and by developing at the proper time a superior fire against the most important targets, skillfully handled artillery of the defense will be able to obtain a superiority even if the opponent's artillery is numerically stronger.

**Night operations.** In order to avoid the heavy losses incident to crossing the hostile zone of fire in attacking an enemy who occupies a strong defensive position, it will often be advisable to utilize the cover of darkness for approaching the position, for deploying and for making a lodgment at the most effective ranges, so as to be in readiness to make a vigorous attack suddenly at dawn. When darkness puts an end to a fight, changes made at night in the dispositions may make it possible suddenly to resume the fight with success. In all these cases, the artillery will play an important part.

"At night, friction and mistakes are much more apt to occur than in the day time, and otherwise unimportant accidents may exert great influence on the course of events. It is almost impossible to control

large bodies of troops on a dark night, and rarely possible to count upon the mutual coöperation of separated groups. It is also difficult to maintain direction and to keep up communication. "It is, therefore, particularly important to make all orders as clear, definite, and simple as possible, and to give subordinate commanders thorough instructions. The success of such night operations depends largely upon the initiative, resourcefulness and energy of the subordinate leaders.

"Accurate information of the terrain and of the enemy is essential to the success of night operations. As a rule, such information will have to be obtained the day before by thorough reconnaissance. When stations of troops are changed during the night, trustworthy guides will be of the greatest assistance. Every effort should be made to surprise the enemy. This requires, above all else, that complete silence be maintained. It is also advisable to provide means by which friendly troops may be distinguished.

"When the infantry advances closer to the enemy under cover of darkness while the artillery remains in its positions, the latter should keep up its fire during the night by the aid of searchlights, or by training its guns on previously designated targets before darkness sets in, and should increase it at daybreak to the maximum intensity. In this connection, it is the duty of the commander of the artillery quickly to adapt himself, to any changes in the situation that may have occurred during the night by making an appropriate selection of new targets and by developing the maximum fire power against the most important targets."

## FRANCE.

**General Principles:** 1. There is no artillery duel and no massed fire; these are replaced by counter-attack and economy of forces. 2. Targets are very seldom completely disabled—it suffices to neutralize them. 3. Success is ensured only by the coöperation of the arms.

Coöperation of infantry and artillery* is attained by the manner in which orders are issued, by accurately designating the points of attack, and by keeping up permanent communication between the artillery, the commander, and the troops. In a circular issued in 1907 by the Ministry of War, attention is called to the importance of this. "Frequent combined exercises of the two arms, including when practicable the use of ball ammunition, will enable officers to make the same estimate of the tactical situation existing at the moment and to act in mutual accord. Officers and men of the infantry should become familiar with the physical

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*NIESSEL, *Chef de bataillon, Combinaison des efforts de l'infanterie et de l'artillerie*, Paris, 1908. Ch. LAVAUZELLE. See *Artilleristische Monatshefte*, April and September numbers 1908.—*Militär-Wochenblatt*, No. 70 of 1908, No. 75 of 1907.—*Revue militaire générale*, June number 1908. NIESSEL, *Procédés de Liaison dans la domaine tactique*. General PERCIN. *La manoeuvre de Lorlanges, exécutée par le 13 corps le 12 septembre 1908.*

and moral effect of artillery fire in order to gain confidence in the assistance of that arm, and to understand that for its own artillery to fire over its heads, a proceeding that may become necessary sometime, involves no danger. The infantry should also learn to take full advantage, by advancing promptly, of the effect produced by the bursts of fire of the artillery, which prevent the enemy, when he shows himself, from using his weapons. In employing such bursts of fire, on the other hand, the artillery should know how often and for how long they can be used in view of the ammunition available. The two arms can learn to coöperate in this manner, only when they are continually associated together in combined exercises. Such exercises are, therefore, an indispensable preliminary condition to success in war."

General GALLIENI, late commanding general of the XIVth Army Corps, stationed at Lyons, lays down the following: "In order that mutual coöperation may, at all times, be attained, the commander of the whole force and the commanders of the artillery, should be thoroughly familiar with the principles of the infantry and artillery regulations and should always keep in touch with the tactical situation and the needs and intentions of the infantry;—in other words, orient each other continually. To this end, the artillery should detail an officer permanently to accompany the infantry that is engaged. This officer should keep the commander of the artillery in constant touch with affairs by means of mounted orderlies, visual signals, and telephone. Furthermore, the attack must not be rushed through as is so often done during maneuvers, at the expense of reality, otherwise the situation and intentions can not be transmitted during lulls in the action and the artillery can not take adequate steps to remove the obstacles that check the infantry." General Gallieni demanded a complete fusion of the activities of the two arms and consequently increased confidence of the infantry in its artillery, as the factor indispensable to success.

In practice, the French have gone farther than their regulations (pars. 624, 625, and 619), which left the duty of selecting a target to the commander of the artillery after he had been informed of the intentions of the commander of the troops. As a matter of fact, the artillery can properly coöperate with the infantry, only when the former is apprised of the wishes of the infantry and when both arms are familiar with their own and each other's sphere of action. Since all European artilleries have adopted gun shields, the French artillery shows an even greater preference for masked positions than formerly,* and, in connection therewith, distribution in groups, in order to facilitate observation and fire direction, which is difficult in long artillery lines. In all exercises, the battalion

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*LE ROND, *Le canon à tir rapide et l'instruction de l'artillerie*, 1906. (*Militär-Wochenblatt*, No. 61, of 1906). General LANGLOIS' views are briefly discussed in LANDAUER, *Merkpunkte für den Batteriechef*, Berlin, 1908.

*Contribution aux exercises de tir en pleins champs par le général* GOIRAN. *Revue mil. générale*, February-March number of 1907.

BOURGET (*Capitaine, officier d'ordonnance de général commandant de XIII corps d'armée*), Paris, 1908. Discussed in *Artilleristische Monatshefte*, January-February number 1908, *Zur modernen Artillerietaktik.*

organization is to be kept intact whenever possible. The French do not propose to engage in a decisive artillery combat before the infantry action begins. Such an artillery combat would cost a large amount of ammunition without bringing about an adequate result. They endeavor to gain the superiority of artillery fire, but in carrying out the attack, they are satisfied with neutralizing, with crippling the hostile artillery. Consequently, they use only as many guns for this subsidiary task, "as are deemed necessary to attain the desired end in the minimum time." (Par. 620, French F. A. D. R.) As the hostile guns can not be counted as of old, the French do not oppose battery by battery, but are content to assign a certain number of batteries the task of firing upon a definite front. When a battery uses sweeping fire (*tir fauchant*), it is expected to cover a front of 200 m. at the most effective ranges.* The remaining batteries are posted in observation (*position de surveillance*), at the disposal of the commander of the artillery, ready to deluge any visible, profitable target with an annihilating hail of fragments. This procedure is a result of the unwieldiness of the French matériel and of the fact that, when posted in a masked position, more time is required to change target.† Single batteries, their guns posted at large intervals (4 guns to a front of 200 m.), are to serve the purpose of drawing the enemy's fire (decoy batteries, *batteries d'armorce*)‡, while the majority of the batteries remains posted in observation, ready to take advantage of any mistake made by the enemy.

**Attack.** When the infantry prepares to begin the attack, it becomes necessary to cripple the hostile artillery with as small a number of guns as possible, and to fire on the point of attack with the greatest available number of batteries. The French incline to the opinion that the fire of their artillery can overcome any check produced by the effect of the enemy's weapons, enable the attacking troops to approach the enemy almost unmolested, and protect them from any counter-attack. The rafale is to be a shield for every movement, whether this be made to the front or to the rear. The desired object is attained when the defender seeks cover, or when a curtain of smoke is stretched before him, which prevents him from seeing and combating the assaulting troops. The effect produced should be so great that the hostile force fired upon will require considerable time to regain its equilibrium.

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*See *Artilleristische Monatshefte*, December number of 1908, p. 418.

†According to an article by General PERCIN in the *Revue militaire générale* (February, 1907), 4½ minutes were required to switch the fire to a target located 500 meters to a flank. The observation station was at some distance from the battery, which was posted in a masked position.

‡*Revue militaire générale*, 1907, p. 223. Progressive fire with sweeping (*tir progressif avec fauchage*) from a single piece is to be used, i. e., four rounds in succession, so as to create the impression that a battery and not a single gun is in position. The battery should not open fire until the bulk of the artillery is ready for action, and then preferably from a point where the enemy might well expect the bulk of the artillery to come into action.

As is so often the case in French regulations, the authors are generous in the extreme on the one hand, only to depreciate the value of their work on the other. According to the *Revue militaire générale*, the attacking infantry will be able to reach the hostile position, 800 m. from its own initial firing position, in sixteen 50 m. rushes, each consuming fifteen seconds, and interrupted by fifteen breathing spells, each from one to one and one-half minutes long. During the rushes, the artillery is to fire four rounds per gun per minute, and during the breathing spells from nine to ten rounds per gun per minute. Technically, this is entirely feasible, as it amounts to 160 rounds per gun. "Every rafale of the artillery will either cause the most advanced line to make a rush, or the troops of the rear line to come up to the firing line, in order to reinforce it or to carry it forward as much as possible. Thus the rafale becomes a veritable shield for the infantry." But the regulations at the same time state that the artillery can continue to fire over the infantry, only so long as the latter has not approached closer than within 500 m. of the enemy. In other words, from the moment that it arrives at a point 500 m. from the enemy, the infantry can no longer count, in general, on the active support of the artillery, though that is the very thing upon which the whole method of attack is based.

The French have paid special attention to the duties of the batteries that are to support the infantry attack. The artillery is to perform the following duties:

1. It is directly to prepare the infantry attack. In the service, the batteries detailed for this task, are popularly called **infantry** or **breaching batteries.**

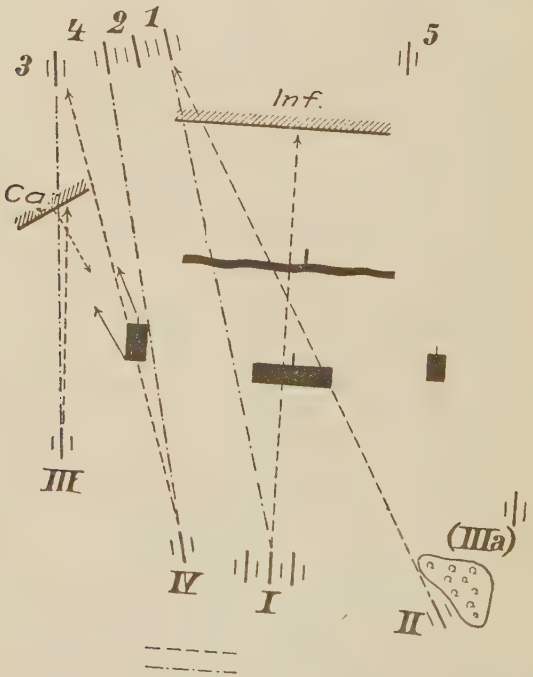
2. It is to remove anything that might interfere with the attack of the infantry, whether such interference consist of a hostile flank attack, or of artillery that, once silenced, resumes firing. Batteries charged with this duty are called **counter batteries** (*contrebatteries*) and **counter-attack batteries** (*batteries de contreattaque*). As soon as the position is taken, the counter-attack batteries hurry at once into it.

3. It is to provide some batteries to accompany the infantry attack. These are known as **accompanying batteries** (*batteries d'accompagnement*).* These batteries follow the infantry from one position to another (for example from a position 2,000 m. from the enemy, to one 1,000 m. and then to one 500 m. from the enemy). Rather than arrive too late with the whole battery, it is better to work only one-half of the guns. The number of batteries to be assigned to the various permanent tasks should be determined by the commander of the artillery in each case as necessity arrives therefor. Battalion organizations need not be kept intact, and provisional battalions may have to be formed to meet the problems that arise.

Our attention is, in the first place, claimed by the breaching or infantry batteries, for it is upon the effect of their fire that the success of the attack mainly depends. They should be crushed by the fire of all

*According to an example cited in the *Revue militaire générale* (February number of 1907), 17 batteries were used as follows: 8 as counter, 3 as infantry, 3 as accompanying batteries, and 3 to cover the flanks.

available howitzer and gun batteries of the defender before the infantry assault begins. At maneuvers, it has frequently been observed that assignment of batteries is made prematurely so that infantry batteries have to change target again and fire upon artillery. Infantry batteries* can fulfill their mission, only when their own and the hostile firing lines can be seen from the battery positions. It will frequently not even be desirable for an infantry battery to act as a unit, and chiefs of platoon must act on their own initiative. This requires that the masked position be given up and that an unmasked position be occupied. But as soon as infantry




I fires upon the hostile infantry, and is in turn fired upon by 1 and 2, whose fire is returned by **II**, which is sheltered by the woods against fire;

III fires upon the infantry of the counter-attack (**Ca**), and in return receives fire from 3 to which

IV replies without bothering about the fire directed against it by 4. Should 5 now open fire against **I**, this may (but need not) be answered by **IIIa**, and certainly not by **I**.

*Revue d'infanterie*, of November 15th and December 15th, 1909.

batteries occupy unmasked positions, they will be exposed to the fire of the hostile artillery, to which they must pay no attention, on principle, for that is the business of the counter batteries. But while the infantry batteries, thanks to their shields, can treat the hostile artillery fire with indifference, the defender's artillery, which is usually firing from masked positions, will not need to bother about the fire of the counter batteries. The batteries designated to repel the infantry attack, as they will frequently have to occupy an unmasked position, are the only ones that will suffer from the fire of the counter batteries. When the batteries of the defense are so posted that the flashes of their guns will not betray the position, the attacker has very little chance of crippling them. But batteries posted in semi-masked positions will often be forced to switch their fire from the infantry batteries upon the counter batteries. The sketches contained in Major BOURGUET'S book show how these counter batteries rest on patches of timber and on villages, which in part hide the flashes of the guns. The French artillery, on principle, refuses to reply to the fire of the artillery that fires upon it and that endeavors to induce it to divert its fire from its target, but directs its fire, instead, upon a target that is firing in another direction (*contreattaque*, par. 631, French F. A. D. R.). The result is oblique fire, which is frequently effective when directed against batteries equipped with shields and is not subject to the same drawbacks that arise when the enemy's adjustment has progressed pretty far.

The employment of French artillery is characterized by the following: Each artillery unit is given a definite, concrete task, which it must accomplish without changing position or target and without bothering about the effect of the enemy's fire. Even when the hostile artillery is superior, the latter's attention must be so completely occupied that it will not dare shift its fire from the attacking artillery to other targets.

General GOIRAN estimates that the following ammunition will be required for the attack proper:*

(*a*) *Preparation of the Attack:*

| | | | | |
|---|---|---|---|---|
| 6 infantry batteries on a front of 900 m., adjustment, 4 rafales | 22 | rounds per gun | = 528 | rounds; |
| 6 counter batteries, adjustment and 10 rafales with sweeping | 40 | " " " | = 960 | " |
| 6 counter-attack batteries, adjustment | 12 | " " " | = 144 | " |
| Total | | | 1,632 | rounds. |

(*b*) *Attack Proper:*

| | | | | |
|---|---|---|---|---|
| 6 infantry batteries | 136 | rounds per gun | = 3,264 | rounds; |
| 6 counter batteries | 80 | " " " | = 1,920 | " |
| 3 accompanying batteries | 60 | " " " | = 720 | " |
| 3 counter-attack batteries | — | " " " | = — | " |
| Total | | | 5,904 | rounds. |

**Revue militaire générale*, 1907, p. 144.

Infantry batteries and counter batteries use up more ammunition than they have available in their firing batteries (158 and 120 rounds, respectively, whereas, they have but 108 rounds apiece). It is, therefore, imperatively necessary to provide for replenishment of ammunition before the attack, which eats up about half of the ammunition carried by the ammunition columns of a corps.

## JAPAN.

Since the Russo-Japanese war, no material changes have been made in the Japanese regulations, which are a reproduction of German service regulations. A battery carries thirty-six rounds of ammunition in each of its six gun limbers, thirty-six rounds in each of its six caisson limbers, and sixty-four rounds in each of its six caisson bodies. The caissons of the batteries are not armored and do not form part of the firing battery (*Gefechtsbatterie*). Each piece has available 136 rounds in the firing battery and reserve, and 75 rounds (including 25 rounds of shell) in the light ammunition column of the regiment. Particular stress is laid upon the coöperation of infantry and artillery, and the latter is warned not to overestimate the value of masked positions. In consequence, the artillery now fires by preference from unmasked or from semi-masked positions. The disadvantages of the semi-masked and the unmasked positions are to be minimized by skillful selection of the position, by use of masks and dummy works, and by posting the caissons 15 m. in rear of the line of guns. When practicable, the guns are to limber up under cover. A battery may effect a change of position even by gun or by platoon, the guns that remain behind meantime enveloping the enemy in a cloud of smoke. Observation stations are to be carefully prepared, masked, and intrenched. Telephone lines have been found very susceptible to damage and serve only for communication with higher commanders. In the organizations themselves, communication is to be kept us by means of visual signals, megaphones, and orderlies. The adjustment of fire is effected as in the German artillery. While the battery commander observes from one flank of the battery, an assistant may sometimes observe from the other. This is of material assistance to the battery commander, and considerably accelerates the adjustment. The Japanese pass directly from fire for adjustment to salvos and volley fire. In progressive fire the range is increased by 100 m. after each round.

**In attack,** the Japanese propose to draw the enemy's fire with decoy batteries and to overwhelm him with the bulk of their artillery posted in groups in observation. They do not intend to bring the bulk of their artillery into action against the defender with the intention of crippling him, until the infantry attack begins. The artillery will often facilitate the advance of the infantry by increasing the intensity of its fire and by enveloping the enemy with a cloud of smoke. It is considered desirable to have ar-

tillery accompany the infantry attack (mountain artillery) particularly for the purpose of annihilating machine guns.

**Defense.** The importance of flanking fire in repelling an attack is emphasized. The counter-attack is to be accompanied by batteries that are not already posted in the first line. In engagements lasting several days, it is considered an advantage to occupy successive positions.

## ENGLAND.

**Attack.** The secondary attack is to induce the defender to launch and to use up his reserves; the main attack is to be made suddenly, when necessary at night, infantry and artillery coöperating closely. If the artillery of the defense opens fire, the artillery of the attack is to reply, in order to force it to divert its fire from the attacking infantry. For artillery to change position by moving forward so as to remain in close touch with its infantry, is considered desirable but seldom practicable, except at night.

Communication between infantry and artillery commanders is considered very important and is to be provided whenever circumstances permit. Orders for the infantry attack are to be communicated to the commander of the artillery and arrangements made to enable the guns to continue firing until the very last moment. The most effective way to support the infantry is to concentrate the fire of guns and howitzers upon the point of attack. The shrapnel of the former will "nail" the enemy to his trenches, force him to keep under cover, interfere with his aim, and divert his attention from the advancing infantry. The fire of the howitzers, whether shrapnel or lyddite shell, will sweep the interior of the hostile shelter trenches and the approaches to the latter, and will delay the movement of reinforcements to the threatened points. In case the artillery of the assailant was forced to cease firing in view of the superiority of the hostile artillery fire, it must resume firing at any cost when it becomes necessary to support its infantry, to ward off an attack made against the latter, or to repel a counter-attack. When the infantry has approached so close to the hostile position as to mask the fire of the guns, the latter are to increase their elevation and to keep up their fire, so as to sweep the ground in rear of the hostile position and to prevent hostile reserves from advancing.

As soon as the hostile position is taken, every available gun is to hurry forward to fire upon the retreating enemy, to maintain the captured position, and to repel an offensive return.

In **defense,** the artillery may be employed either in mass or, when the enemy has a superior number of guns, dispersed, i. e., by battery or platoon. Opportunities to bring enfilade or oblique fire to bear and to sweep certain areas with a cross fire from the dispersed groups, should never be neglected. At the same time, the artillery should endeavor to

prevent the enemy from delivering oblique or enfilade fire. As a rule, it is desirable to attach artillery to the general reserve, or to hold it in reserve with other troops for use in the counter-attack. When it appears inadvisable to place all the artillery in action at decisive ranges, it will always be a good plan to despatch mobile batteries to the points where their presence might become necessary. If the artillery has no chance to win in the artillery combat, it is to be used to repel the attack, to force the hostile infantry to reply prematurely, and to batter the hostile artillery while the latter is advancing. In warding off the infantry attack, special tasks will have to be assigned. Some batteries will have to give up their masked positions in order to repel the attack, whereas others stand prepared to prevent the hostile guns from concentrating their whole fire power against those batteries. It is considered particularly important to distribute the heavy artillery among the various parts of the position, as this best enables the defense to bring effective fire to bear upon the advancing hostile troops, no matter from which direction they may be coming, and to force the enemy to deploy prematurely.

## RUSSIA.

At the beginning of the Russo-Japanese war, the Russian artillery suffered from a want of familiarity with its new matériel. The Russian regulations were obsolete and in no way adapted to the changed matériel. Although these regulations specified that, upon gaining contact with the enemy, aggressive action was to be the keynote of all operations, it is a fact that commanders of troops were singularly averse to assume the offensive. The requirement that as many guns as possible be brought into action from the very start was inconsistent with the demand that a reserve of artillery be maintained. During the whole course of the campaign, the Russian artillery evinced a disposition to fire at long range. This was partly due to the character of the terrain and, in the opening fights of the war, to the desire to keep the Japanese at a distance by bombarding them with shrapnel that was known to have a greater range than that of the Japanese. The artillery was to avoid firing over friendly troops.

According to the Russian Artillery Firing Regulations, a battery is permitted to fire over other troops in exceptional cases only, the battery commander being held personally responsible. Even in such exceptional cases, it is to fire over other troops, only when all danger of striking these troops is precluded and there is no likelihood of their being alarmed by the shrieking of the projectiles that pass over their heads.

"None of the regulations of other armies contains such strict rules, which, in addition, admit of any number of interpretations as to the feasibility of firing over friendly troops. It is due to these rules that in our last war, the artillery very often—to be sure, in the opening engagements only—ceased firing at the very moment when the fight had reached its

most critical stage. Later on, all this changed. Firing over friendly troops became the rule, and the men listened with pleasure to the shrieking projectiles that passed over their heads, for they knew that their artillery was fighting with them and helping them."*

In defense, the construction of artificial cover was to be restricted to the minimum required, in order that freedom of action might not be sacrificed. Russian artillerists showed a preference for the French views of fire tactics, and followed the teaching of General Langlois. They failed to bear in mind that the French regulations were specially designed for batteries equipped with shields and, further, that it was Langlois who demanded that the infantry be vigorously supported by its sister arm, and this support was not furnished during the Russo-Japanese war. Langlois recommends masked positions, but he also insists that the battery commander observe and, at the same time, direct the fire of his battery. The practice, borrowed from the French, of distributing duties among the various batteries, combined with their own *penchant* for forming reserves could lead to but one result, viz., the Russians never obtained an actual superiority of artillery fire. In contrast to the French artillery, the Russian artillery fought at first on principle in unmasked positions, and did not adopt masked positions until it had suffered several defeats. The views of commanders of troops and commanders of artillery clashed. As a consequence, artillery commanders encountered unnecessary difficulties. The Russian artillery fought almost exclusively in defense; its tactics were characterized by long range fire, by searching fire, and by distribution in groups, in masked positions. The guns were frequently posted as much as 400 m. in rear of a crest.

New combat regulations are in course of preparation. The inclination, prevalent up to a short time ago, of fighting exclusively in masked positions, is counteracted by more rational views. Great importance is attached to thorough, unhurried reconnaissance, and to the use of reconnaissance parties. The defender is to be held all along the front, and the bulk of the artillery is not to go into action until the point of attack is recognized.

The principal duty of the artillery consists of supporting the infantry. During the preparatory stage of the action, "decoy platoons,"† endeavor to draw the hostile fire, the bulk of the artillery then coming into action against the hostile artillery until the superiority of fire is attained. As soon as this is accomplished, the bulk of the artillery is to direct its fire upon the point of attack, the remainder is to keep down the fire of the hostile artillery. In general, the fire fight with the hostile artillery is conducted

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**Russian Artillery Journal*, December number 1905.

†Colonel NOVIKOV is authority for the statement that the Japanese drew the Russian fire by pushing forward platoons of mountain artillery, which offered but a small target and could disappear quickly and then deluged the Russian artillery with fire from another direction. (A translation of Colonel NOVIKOV'S book appeared in the December 1906 and January 1907 numbers of the *Journal des sciences militaires*).

from a single position, but as soon as the superiority of fire has been gained, and good positions are located farther to the front, a part of the batteries is to go forward to occupy them with the intention of enfilading the enemy. When the infantry has approached to within 350 or 400 m. of the hostile position, the artillery is to sweep the ground in rear and flank of that position and to inflict damage upon the reserves and adjoining troops of the enemy.

In defense, the artillery is to occupy masked and semi-masked positions. During the artillery combat, its observation stations are to be in advance and intrenched. Telephone lines are to be laid underground. Single guns or platoons may be pushed forward for fire for adjustment. A second position, from which it can repel the infantry attack, is to be prepared. According to the regulations, it may likewise be a good plan to push forward a few guns for repelling the assault. The regulations state than an attacker will find it exceedingly difficult to locate the true position among this maze of dummy works, masks, supporting points, shelter and cover trenches.

General WORONZOV-DASHKOV warns the artillery not to betray the position by prematurely opening fire. He maintains that the defender need not reply to the long range fire of the assailant at all, or could take small units out of the position for this purpose and thus mislead the attacker.

The defender is vitally interested in combining a large number of guns for repelling the hostile attack; he must see to it that each one of the routes over which the enemy is likely to advance is at once vigorously swept by the fire of the battery assigned to that front, the so-called "combat section battery." When the position is very extensive, some of the batteries are to be kept in reserve for the time being, and not brought into action beside the "combat section batteries," until it is clearly apparent from which direction the hostile attack is coming.

## VIII. MOUNTAIN ARTILLERY.*

The demand that artillery support the infantry in mountain warfare even where wheeled carriages can not move, has induced those states whose armies are likely to be called upon to operate in mountainous country, to form mountain batteries. The matériel of these batteries is light and transported in sections on pack animals, each carrying a load varying from 80—150 kg. This matériel has the following characteristic properties:

The guns can not come into action very quickly, can move only at a walk and are unquestionably inferior to field guns. The replacement of ammunition is very slow. Ammunition is carried on pack animals. Since the mountain guns have only a slightly longer range than the latest infantry rifles, the superiority of mountain artillery over infantry is due entirely to greater effectiveness of its projectiles, greater ease of observing the shots and greater accuracy. The Austrian 7 cm. mountain gun, model 1909, a recoil gun equipped with shields, fires shell and shrapnel, and has an extreme range of 4,000 m.; the height of the axis of the piece in action is 64 cm. The ammunition carried with the battery amounts to 76 rounds of shrapnel and 36 rounds of shell per gun. A battery of four guns has about 70 pack animals. Six pack animals are reckoned per gun, two carrying sixteen rounds of shell or of shrapnel each. The projectile weighs 4.68 kg. The 10 cm. mountain howitzer, model 1908, is also a recoil gun equipped with shields. The limber is used only in drawing the gun. The carriage, cradle and barrel are transported separately on wheels, and consequently, confined to moving on roads. Two ammunition pack animals carry six rounds of shell or of shrapnel.

*See *Taktik*, VI, p. 269, *et seq.*

The maximum range of the shrapnel is 5,700 m., that of shell 6,000 m. Each gun has available 60 rounds of shell (each weighing 11.7 kg.) and 60 rounds of shrapnel (each weighing 12.7 kg.).*

In attack, mountain artillery is almost invariably to operate by battery. Specifically, it is to support the ascent of the infantry, prevent the enemy from moving forward from his positions, give its infantry a chance to take breathing spells, and support the infantry attack by firing on the enemy from commanding positions. On the march, the pack animals move in single file, half of the cannoneers are posted in the lead to make any repairs in the road that may be necessary, and the other half march with the battery. The march of a mountain battery is made more difficult by the fact that in ascending a mountain path, a pack mule accelerates his pace, whereas a man moves more slowly; and conversely, on descending a man accelerates his pace, whereas a pack mule moves more slowly. In the firing battery, each gun is immediately followed by one pack mule carrying ammunition. In the Russo-Japanese war, the Japanese used their mountain guns with good results to accompany their attacking infantry.

*The following will give an idea of the strength and composition of a mountain battery:

**France:** 4 officers, 226 men, and 160 horses and mules; 4 guns (80 mm.) and 2 caissons; 122⅔ rounds of shrapnel and 11⅓ rounds of canister per gun.

**Austria:** 3 officers, 110 men, 6 horses, 63 mules; 4 guns (7 cm.) and 2 caissons; 48 rounds of shell, 56 rounds of shrapnel, and 8 rounds of canister per gun.

## IX. HORSE ARTILLERY.*

The horse artillery attached to the independent cavalry increases the offensive and defensive power of the cavalry. The fire of horse artillery is capable of forcing the enemy to deploy his route columns or of diverting them from their march direction. Guns attached to an independent part of a cavalry division, may deceive the enemy and give the division commander information of an encounter.

The commander of the cavalry decides whether he will employ his artillery or not (decision of the commander of the 5th Cavalry Division on the morning of August 16th, 1870). He communicates his intentions to the commander of the artillery and issues the order for the artillery to go into position. In case he decides not to use his artillery, it may be left behind either in observation or in readiness. The artillery commander, when necessary, makes suitable suggestions to his chief in regard to the use of his arm.

In the service of reconnaissance, horse artillery will most frequently be employed to break down the resistance of the enemy, or to increase, when requisite, the power of resistance of the cavalry. Sometimes a few platoons, to which caissons may be attached, suffice for this purpose. (Par. 500, German C. D. R.). When ravines or defiles have to be crossed in retreating in face of the enemy, the artillery should retire first through the defile and by its fire prevent the enemy from pressing his pursuit. When such ravines or defiles have to be crossed in the advance, the artillery should take up a position on a flank of the defile, when practicable, and fire upon the enemy from that position until the cavalry has passed through the defile. (Par. 338, German C. D. R.). The advance guard of a cavalry division is pri-

*Pars. 522–535, *German F. A. D. R.*, and pars. 497–513, *German C. D. R.*

marily charged more with protecting the main body than with fighting. Accordingly, artillery is assigned to the advance guard in exceptional cases only. As the advance guard consists only of about a regiment, the artillery, if assigned to it, would prove nothing short of an encumbrance. The horse artillery battalion is usually posted in rear of the machine guns of the leading regiment of the main body. This best assures getting the guns into action early. During the development for action, it may be advisable to bring up the artillery successively from one position to another.

In action, the artillery, without regard to the losses that it may suffer in consequence, should combat the target that is of decisive importance. It should quickly make the most of any weakness of the hostile artillery. In general, fire directed upon the hostile cavalry does not promise speedy results.

In the action of cavalry against cavalry, the artillery should go into position as early as possible, in order to support first the deployment and then the charge of its cavalry. Since the batteries move more slowly than the escadrons, the commander of the artillery should, as a rule, be the first to get his orders when a deployment is contemplated. It is also a good plan for battery commanders to remain with their battalion commander when the deployment of the artillery is imminent. It is desirable for the horse artillery to engage the hostile artillery, only in the event that the cavalry has not as yet been launched. When the hostile cavalry is visible, the artillery should direct its fire upon the leading hostile line and crush it, so as to ensure the success of the charge of its own cavalry. In case the hostile cavalry is defeated, it will be immaterial how much the hostile artillery has been crippled. It is only when, just before the collision, the artillery can no longer fire upon the hostile cavalry without endangering its own troopers, that the fire should be directed upon the hostile artillery. The artillery should fire upon the enemy as long as possible. This requires

that it take up a position in advance and to a flank of the rendezvous position of the division. Such a position likewise best protects a flank of the advancing cavalry. French tacticians very pedantically place this position some 200 or 300 m. to a flank and some 600 or 700 m. in rear of the area in which the collision will, in all likelihood, occur. If the enemy has the same intention, the two opposing artillery forces would have to go into action some 600 or 800 m. from each other. This is impracticable. The foregoing discussion shows how important it is to throw the artillery forward with the utmost despatch as soon as the commander has made up his mind to charge. When so thrown forward, the artillery will get ahead of the hostile artillery, and will force it to unlimber a long distance off. This will prevent the hostile artillery from intervening in the mounted action as effectively as our own artillery. French tacticians have proposed that the artillery be posted in front of the center of the concentrated division. This is impracticable in most cases, as it would force the cavalry to make extensive turning movements. In many cases, it may be advantageous to throw the artillery forward under the protection of a weak support and then to make an attack with the entire division against the hostile cavalry as soon as the latter prepares to charge the batteries. Theoretically, a position on the interior flank is the best, as it constitutes a pivot and permits all available forces to be massed on the opposite flank. If posted on the exterior, i. e., exposed flank, the artillery has farther to go, hampers the movements of its cavalry, and is very apt to lose touch with the latter. No historical instances of such artillery employment have come to my knowledge.

The artillery of the division, one battalion, is sent into action intact, the guns being posted, when necessary, at diminished intervals. When time is pressing, the fire of the whole battalion of artillery, controlled by a single person, is required to tear gaps in the hostile line and to make the latter

waver. When one battery is posted on each flank, the movements of the cavalry would very shortly mask the fire of one of them. To separate the two batteries of the battalion and to post them on the flanks, not only scatters and impairs the fire effect, but increases the difficulties of fire direction and usually tends to hamper the movements of the cavalry. The more rapid the course of the action, the more swiftly favorable opportunities for firing pass, the more necessary is it to keep the artillery together, in order that an intense fire effect may be produced at one point at least. The very nature of the cavalry action compels artillery to take up unmasked positions and precludes a change of position on its part before the decision. The peculiar character of mounted actions will often make it advisable to keep the limbers near the guns. It may be a good plan to leave behind a part of the battery reserves and the ammunition wagons of the machine gun battery at a sheltered spot and to assign the light ammunition column to a place ahead of the field train.

The echelon or unit nearest to the artillery is charged with protecting the artillery against hostile attacks, an order to that effect being unnecessary. A special support is assigned to the artillery when needed, the necessity therefor being determined in each individual case. When the batteries are some distance from the division, it is, of course, necessary to detail such a support, but when they are posted in the immediate vicinity of the division or are protected by the terrain from direct attack, it is usually a mistake to detail a support, as it reduces the effective strength of the division.

When a part of the hostile cavalry charges the artillery, this should be an additional inducement for the cavalry commander to crush the remainder of the opponent. If he defeats the hostile cavalry, he will regain not only his own artillery, in case that has been captured, but almost invariably also that of the enemy. The main thing is to

assure the victory of the cavalry, and that is accomplished by throwing every available trooper into the fight. In case of defeat, one or two escadrons can not save the artillery anyway, and the latter may very well be able without assistance to repel isolated attacks. The artillery commander will have to decide whether he ought to maintain his position or whether he should retire into a rallying position. In any case, it will usually be too late to adopt the latter course.

Attacks from the rear upon the artillery are by no means impossible in a cavalry action. Should such an attack be made, the artillery can do nothing but face about under fire and fire to the rear.

The conduct of Caspari's Battery (VIIIth Army Corps) at Königgrätz.*

"The battery held its fire and received the charge of the hostile Uhlans with canister at very close range. Only a few of the hostile troopers, who were unable to turn in time, passed through the gaps between the guns and attempted, by making a wide detour, to regain the part of their regiment that was being driven toward Stresetitz. Another attack made against this same battery by a large body of hostile Uhlans that had been held in rear of the hostile left flank, was also repulsed by Captain Caspari with canister at 200 paces."

During the campaign of 1866, this maneuver was executed twice in the Army of the Main, by Blottnitz' Battery (the 3d 4-pdr. Battery, 6th F. A.) at Langensalza, and by König's Battery (the 4th Horse Battery, 7th F. A.) at Hettstadt.

When the cavalry fights on foot, the artillery is used according to the principles that govern its employment in an action in which all three arms are engaged, but the mobility of the cavalry and the fact that it is usually impossible, for lack of time, to wait for the artillery to produce its full fire effect, should be taken into account. In defense, it may frequently be advisable to use single platoons of artillery.

*Also the conduct of Ohnesorge's Battery in front of Fröschweiler at the battle of Wörth. HOFFBAUER, *Deutsche Artillerie*, II, p. 67.

"The batteries assigned to the cavalry remain with it in battle, as they are indispensable to that arm during and especially after the battle, in accomplishing the special tasks with which it is charged. But the cavalry leader should carefully consider whether the tactical situation does not require that his batteries be used in conjunction with the rest of the artillery." (Par. 506, German F. A. D.R.).

The German regulations, contrary to the views entertained by the French and the Russians, very properly place the decision of this question in the hands of the commander of the cavalry division. When the main battle is preceded by an encounter of the opposing cavalry forces, as, for example, was the battle of Mars-la-Tour, on the morning of August 16th, 1870, the horse batteries will quite naturally remain in action and continue firing in conjunction with the other artillery of the various army corps.

When the cavalry is posted in rear of the fighting line, it can usually dispense with the support of its artillery, but when it is posted on the flanks, it will often sorely miss the coöperation of its horse batteries. At Vionville, the commander of the 10th German Field Artillery Regiment refused to allow the horse batteries of the 5th Cavalry Division to rejoin their division, although he had been requested to return them. No doubt, these batteries could hardly be spared where they were, but on the other hand, they could have rendered the 5th Cavalry Division very effective assistance in its fight on the left flank. Artillery is indispensable to a cavalry division when the latter is charged with the task of operating against flank and rear of the enemy and of keeping hostile reinforcements away from the battlefield.

These views were not sanctioned in Germany until the appearance of the Cavalry Drill Regulations of 1896, in which they were incorporated. According to the views formerly entertained, for example, those contained in the F. A. D. R. of 1892, horse batteries of the cavalry division were to be used in conjuction with the artillery of the army corps and not to rejoin their own division until after the battle. (Example: Horse batteries of the 5th Cavalry Division at Vionville). Prince Hohenlohe* also held

*Gen. St. W., pp. 413 and 414. HOHENLOHE, *Briefe über Artillerie*, p. 169.

these views, arguing that in battle the cavalry division had nothing to do but reap the fruits of the victory gained by the other arms, whereas in the fight itself, the most important thing was to crush the hostile artillery as soon as possible.

When the horse batteries of a cavalry divsion that is ordered to pursue, are fighting as part of the rest of the artillery of the various army corps, the cavalry division will frequently be unable to get them to join in time. And even if they do join in time, it will be found that their mobility has been materially impaired by the protracted artillery combat in which they have been engaged.

The 4th Cavalry Division did not have the good fortune to make a charge at **Loigny**, but, nevertheless, it achieved notable success in that battle, for Michel's Cavalry Division evacuated the battlefield before it; the French left wing was kept in constant apprehension; the advancing 3d Division of the XVIIth Army Corps was diverted from its objective, Villepion, and its arrival at the decisive point delayed. While the fight for the possession of Loigny still raged furiously, the two batteries of the 4th Cavalry Division were in position near Gommiers and fired into the rear of the French masses concentrated around Loigny, Favrolles, and Villepion. The French artillery was in several instances forced to turn upon these batteries.*

**France:** On the march, the reserves may be divided into two parts, of which the first, which consists of three caissons for each battery, follows from 5 to 6 km. in rear of the batteries, the second joining the field train (*train regimentaire*).

The two horse batteries assigned to a cavalry division are to prepare the attack with their fire, by throwing the hostile escadrons into confusion. Supports are permanently attached. Their commander is responsible for the safety of the artillery, but is not under the orders of the artillery commander. During the advance, roads are to be used as long as possible.

When the cavalry division is operating as a unit, the proper position for its horse artillery is usually from 400 to 500 m. in advance of the division, an escadron being assigned as a support, but it may be posted on a flank. In the latter case, it must be so posted as not to interfere with the movements of the cavalry. The batteries are employed together as a rule. When a charge is contemplated, it is a good plan for the batteries to go into position some 800 m. from the flank of the charging ground. From this position, they should endeavor to fire as soon as possible on the advancing opponent. It may likewise be advantageous to throw the batteries forward, properly supported, to induce the enemy to attack them,

*KUNZ, *Schlacht von Loigny-Poupry*, p. 116. See also the discussion of the employment of the cavalry at Mars-la-Tour, note 2, p. 97, *supra*.

and then to charge him in turn while he is charging. The batteries should first direct their fire upon the leading hostile line. During the collision, they should direct it against advancing hostile reserves or against the hostile artillery. Should the enemy turn tail, the batteries should cease firing to avoid injuring their own troopers.

In battle, the horse batteries usually remain at the disposal of the commander of the cavalry division.

**Italy:** Like the Germans, the Italians believe that the value of assigning horse batteries to the cavalry, lies principally in the support they render that arm in reconnaissance and not in their coöperation in preparing the attack. The Italians hold the same views as the Germans, in regard to the employment of horse artillery. Since cavalry actions are of very short duration, the artillery is to obtain an effect quickly by concentrating its fire on the decisive point. The regulations state that changes of target and of position are precluded. For this reason, the artillery position is to be selected with a view to enable the artillery to fire on the enemy as long as possible without hampering the cavalry and without being hampered by the latter. In selecting a position, considerations of speed and effect take precedence over those of cover. When it is impossible to determine beforehand on what flank the artillery is to operate, it marches 100—150 paces either in front or in rear of the center of the first line. The artillery is to direct its fire upon that part of the hostile cavalry that is to be attacked first. This fire may be continued, even during the charge, provided the artillery position lies far enough to a flank. When the artillery can no longer fire, it awaits the outcome of the cavalry action with its guns limbered and in readiness to change position if necessary. In case the enemy is routed, the artillery joins the cavalry so as to be on hand during the pursuit to prevent the enemy from making any lodgment. If, on the other hand, the charge is repulsed, and a continuance of fire is impossible from the position taken up, the artillery is quickly to retire to a rallying position in rear. In general, the nearest line is charged with protecting the artillery, but an order to that effect is unnecessary. But it is considered a pretty good plan to detail anything from a platoon to an escadron as an artillery support in order to give the cavalry greater freedom of action. In battle, the artillery assigned to the cavalry is to go into action alongside of the rest of the artillery. After a victory, it is to rejoin the cavalry in order to take part in the pursuit.

**Austria:*** The provision that artillery is, on principle, to operate intact, has not been incorporated in the latest regulations. "During a charge, the horse artillery, making the most of its mobility, should come into action unexpectedly at the proper moment, so as to divert the attention of the enemy from the cavalry and to draw the fire of the hostile artillery upon itself. Besides, it should shake the charging hostile troops with its fire, interfere with their deployment, and effectively prepare the charge

*Major-General v. CZERLIEN, Austrian Army, *Kavalleristische Studien*, Vienna, 1905, p. 9 *et seq.*

of its own cavalry." The regulations demand that fire be opened at an early moment and that it be kept up as long as possible. But in case the fire directed upon the hostile first line might injure friendly troopers, it is to be turned upon the rearward hostile lines and reserves. The fire is to be directed upon hostile artillery and machine guns, only when no cavalry targets are available. If the charge is successful, the artillery is to change position quickly, in order to make the most of the victory and to cover the rally. If the charge is unsuccessful, the artillery is either to change position quickly, or to check the pursuing enemy.

"In a battle, horse artillery may be particularly valuable in case the cavalry divisions are employed to operate on the flanks and rear of the enemy. Its flanking fire will alarm the enemy, paralyze his initiative, draw troops away from other points, and create situations than can be utilized to advantage by the cavalry.

"When it is impossible to use large bodies of cavalry, the horse artillery attached to them can, in exceptional cases, be used with advantage in conjunction with other troops. Its great mobility should in this event also be utilized."

**Russia:** The regulations require that the batteries be kept together, but do not state with sufficient emphasis that the hostile cavalry is always the principal target. When the cavalry can not wait until its attack is prepared by the artillery, the latter is to direct its fire upon the reserves and the artillery of the enemy. Fire is to be opened at an early moment so as to produce a moral effect and to divert the enemy's attention from the cavalry. The artillery is to go into position in front of and some distance away from a flank of the deployed cavalry. But this position is not to be so far to the front that the collision of the opposing cavalry forces will probably take place in rear of the batteries. As soon as the target is masked by the advancing cavalry, the artillery is to direct its fire upon those sections of the hostile attack formation that are nearest the immediate objective of the charge. A change of position is precluded. Movements may be made at the field gallop of the cavalry. A special support of from one to two escadrons is always to be provided for the batteries. The commander of this artillery support is responsible for the protection of the artillery, but may participate in the action of the remainder of the cavalry when the latter operates in his vicinity. When the batteries can no longer continue firing during the charge, they limber up and either await the outcome of the mêlée or retire into a rallying position.

In preparing the charge against infantry, the horse artillery is to be given sufficient time to gain actual results. It is to direct its fire against the supports and reserves of that section of the hostile line against which the charge is to be launched.

In a battle, the batteries are, on principle, to remain with the cavalry units to which they belong, even when the latter are held in reserve.

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